History of Psychology Documentation

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Britt Anderson (and others)

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CHAPTER 1

Preface

Author Britt Anderson

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1.1 1 A meandering introduction

This book grew from my notes and experience teaching the History of Psychology course at the University of Waterloo. I started teaching this course in Jan 2008. I was assigned this course for a couple of reasons. Most importantly, I was the newest departmental member, and really had no idea what I could or should say yes and no to. Secondarily, I had a background in Neurology where eponyms[1] are common. By virtue of my common use of the names of physicians of long ago, I was viewed as sufficiently historical.

I was very anxious that first year. While I knew a lot about the brain and behavior, my background was not psychology *per se*. Fortunately, I was deluged with examination copies of textbooks on the topics. Many were very good. All were expensive.

They were also very similar. Why shouldn't they be? There is a canonical view of psychology as a science that goes back to Boring. The various books did not differ in content as much as they differed in style and in depth. There were small differences in coverage that usually revolved around how far back the author wanted to go into the philosophical origins, and occassionally in later movements, e.g. whether psychoanalysis was included.

[1] Here are a couple of classic examples. The Babinski sign is seen normally in very young children, and later in life as evidence of upper motor neuron injury. I believe I read somewhere that one of the first cases was in a trapeeze artist who fell and suffered a spinal injury, but I have never been able to find that source again. But this is a nice demonstration of what I am talking about. Here is an online version of the original report of Babinski: Sur Le Réflexe Cutané Plantaire Dans Certaines Affections Organiques Du Stystème Nerveux Central. Another example is Broca's aphasia, which is named after the French surgeon and anthropologist who is most credited with demonstrating that it is the left cerebral hemisphere that is specialized for language. Here is an early report of the case of Lelong : and a translation of his 1865 report (pdf).

That first year these books saved me. I read many of them in developing and preparing my own lectures, and used the consistency of their treatments to help me organize my own content. Disappointed by the expense, and in an effort to avoid redundancy between the readings and the lectures, I chose a small, and relatively inexpensive textbook as the course's required text.

What surprised me about these textbooks was that each year I kept getting more and more of them. Why were so many redundant texts necessary? Why were new editions released yearly? My guess is money. History of Psychology courses are common components of psychology curricula. Each publisher wants their own offering. Writing a widely adopted text can be very lucrative for the authors. And by putting out a new edition every year, which given that new scholarship doesn't accumulate that rapidly for historical topics cannot be justified based on pedagogical principles, the re-use of books from previous terms is discouraged. Looking at these editions from one year to the next I could often not tell what had changed. Often the covers were the same. I began to develop conspiracy theories. When I saw that a collection of original articles, with annotations, was selling for over $60 Canadian I began to feel that the students were being taken advantage of.

At one point in time this packaging and reselling of old works with commentary could have been justified, but not anymore. This is the internet age, and there are wonderful resources for letting students read the original works easily. In many cases the expiration of copyright allows for the originals to be redistributed. In most North American Universities the library's subscription allows access to repositories like JSTOR that have all the old, classic psychology journals on line (the APA does this as well). Why have my students pay $100 for a textbook and a collection of readings, when I could give them links to the originals and we could use our class time for discussion.

This practice had an uneven result. Some students participated, but many did not. And while some read around the original material to fill in their background knowledge, many did not. I wanted some core collection of facts that I could require them to know.

For the last two offerings this has been provided by Kardas. This publisher has allowed for me to have a selection of the chapters printed which saves the students money from not having to purchase the whole book. In addition, they can buy on-line access to the chapters for even less. Since this is not a book that most students will consult as a reference, that has seemed a cost efficient compromise.

But I am beginning to doubt whether even that is necessary. As my collection of links to on-line resources, podcasts, original articles, obituaries, and archives grows, I am beginning to believe that a *textbook* could be made of this material with some bridging text and commentary. While some students may need or want the social atmosphere of the classroom discussion for developing their own ideas, others may be satisfied with self-study. By making the materials available on-line and with a print on demand mechanism, students could decide for themselves on the format. And since I assume that I am only one of many instructors stumbling down this road, others could make use of my materials either taken as a whole or by cutting and pasting with their own edits, changes, additions, and subtractions as they see fit.

Where I am now is that the book should be a guided tour through the history of psychology with many links to freely available material. I should explain what I think is interesting, and why. I should explain why I chose what I chose. But others should be free to grab the whole thing and make it their own. That led me to put the book in a github repository. Students should be able to read it on-line to answer a question, Wikipedia-like. Or they should be able to print it out as a pdf. Or, in this day of the e-reader, they should be able to generate a more friendly version of the file, e.g. epub. Therefore, I am using the Sphinx documentation system to allow all these different formats to be generated from the same text. And to make the material available without putting myself in the position of IT support and webmaster, I am using the readthedocs organization to host the materials. They are the only ones, really, that are spending any money to make these materials available. If you use this material I hope you will consider supporting readthedocs.

1.1.1 1.1 Some technical comments

If you clone the github repo (here) you will find several different file types.

1. `.org` files. These are written using the org-mode flavor of markup. I know this markup flavor, and like it. It makes use of emacs, which is my text editor of choice. However, Sphinx makes use of restructured text files. To create these I use an exporter to convert my `.org` files to `.rst` files. If you are not an emacs user, you are not

interested in org-mode, and you are only planning on making changes for yourself or your own fork then you should edit the `.rst` files directly. If you want to contribute back to the project in the form of a pull-request, then you need to edit and give me `.org` files.

2. `.rst` files. These are restructured text files.
3. Sphinx takes the `.rst` files and converts them to `.html` for viewing on the web, to `.pdf` for printing (or viewing on line), and to `.epub` for e-readers. You can view and read `.epub` on line as well. For example, there is a Firefox plugin.
4. After I edit everything on my local machine I export from `.org` to `.rst` and then use the Sphinx created `make` commands, such as `make html` to produce the `.html` files. I then `commit` those changes to my local github repository (aka repo), and `push` that commit to the origin at github.com. From there I can sync it to the readthedocs.org site.

CHAPTER 2

What is Psychology?

Author Britt Anderson

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2.1 1 What is psychology?

To productively study the history of a topic, especially if you wish to apply those lessons to contemporary practice, you must be clear on the nature of that topic in the first place. The answer to the question of what is psychology is not as easy as it might appear, and this is particularly true if you are relatively young or a newcomer. Psychology was not

always as it appears today. While contemporary definitions reflect prevalence and practice they are not proscriptive or prescriptive. That means that you are free to apply an idiosyncratic definition, or emphasize older themes. In any of these cases you should decide exactly what it is you mean by the term psychology. That is the way to get the most practical and personally relevant information from your historical inquiry. Take a moment before reading on and write a one sentence definition of what psychology is. Then see how some others have defined it.

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2.1.1 1.1 Aristotle

psychology studies the soul (psuchê in Greek, or anima in Latin); so it naturally investigates all ensouled or animate beings. Standford Encyclopedia of Philosophy Aristotle 300s BCE

2.1.2 1.2 John Stuart Mill

The subject, then, of Psychology is the uniformities of succession, the laws, whether ultimate or derivative, according to which one mental state succeeds another — is caused by, or at least is caused to follow, another. – The Logic of the Moral Sciences (first published 1843).

2.1.3 1.3 Wilhelm Wundt

the investigation of conscious processes in the modes of connexion peculiar to them. – Principles of Physiological Psychology (translation of the 5th edition) 1904

2.1.4 1.4 Edward Bradford Titchener

the science of mental processes. — An Outline of Psychology 1902

2.1.5 1.5 William James

Psychology is the Science of Mental Life, both of its phenomena and of their conditions. — The Principles of Psychology 1890

2.1.6 1.6 John Watson

Psychology as the behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. — Psychology as the Behaviorist Views it 1913

2.1.7 1.7 George Trumball Ladd and Robert Sessions Woodworth

We shall, therefore, consider psychology as that science which has for its primary subject of investigation all the phenomena of human consciousness, or of the sentient life of man. Elements of Physiological Psychology 1911

2.1.8 1.8 David G. Myers

the science of behavior and mental processes — Psychology (10th Edition) 2013

2.2 2 What's in a name?

"Psychology" comes from the Greek word "psyche" that means breath, life or soul and actually has an interesting myth tied to it. This myth depicts a great love story between Eros (Cupid in Latin), the son of Aphrodite, and a mortal woman, named Psyche. In short, Psyche was considered to be the most beautiful mortal woman - even more beautiful than Aphrodite, the goddess of love and beauty. Out of jealousy, she sends her son to make Psyche fall in love with a terrible creature but accidentally scratches himself with his arrow with her in his sight. Eros falls in love with her, and after much trial and turbulence the two are wed and are no longer persecuted by Aphrodite. Psyche is made immortal and joins Eros in the sky.

2.3 3 Some comments

As we shall see scientific psychology commences in the 1800s. Its origins are firmly established by those who want to connect physiological procedures and the physiologist's rigor with the psycho-physical principles of Fechner. Can we measure a thought the way we measure mass? Weight is how heavy things feel. Fechner claimed to have a procedure by which psychological intensity could be quantified, and related to physical intensity. If so, could we use this insight to develop a true science[1] of inner experience?

Many early scientific psychologists soon found this definition limiting, but more critically they found it a failure. Early controversies about whether or not thought required images, or how many elemental sensations there were left many psychologists despairing that a definition of psychology that focused on the mental could ever be the basis of progress. In a quest for objectivity in measurement the focus shifted to behavior, and this emphasis on behavior is still present in today's textbook definitions.

2.4 4 A Few Final Questions

Does equating the science of psychology with the study of behavior make its practitioners more scientific? Does it do so at the expense of making them no longer psychologists? If psychology were to return to a pre-occupation with the mental (though we can try to avoid facing that by referring to it as *cognitive*) does that mean its practitioners are no longer doing science?

[1] And while thinking of definitions, ask yourself what makes something a science? Does psychology today meet that definition?

CHAPTER 3

Philosophical Antecedents

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  - *2.3.1 Auguste Comte: The brain is the organ whereby dead people act on living ones*
  - *2.3.2 George Berkeley: To be is to be perceived*
  - *2.3.3 David Hume (1711 - 1776)*
  - *2.3.4 Immanuel Kant (1724 - 1804).*
  - *2.3.5 Julien Offray de La Mettrie (1709 - 1751)*
  - *2.3.6 David Hartley. (1705 - 1757)*
  - *2.3.7 Alexander Bain (1818 - 1903)*
* *2.4 Question for Review, Discussion, and a Scavanger Hunt*

3.1 1 Where to begin?

The questions which motivate many to study psychology are ancient. Thus one could easily justify starting with the Greeks: Plato, Aristotle, and many less well known thinkers who had views on consciousness, perception, memory, and emotions — all topics of contemporary interest[1] . And while that choice would lead to interesting discussions and readings, and while it would give rise to an informed context for modern debates, it would not advance those debates. The same questions reappear across the centuries, are not resolved, and leave little sense of progress. One should look closer to modern times to frame the stage for scientific psychology's origin.

But one should not leap too far. Jumping all the way to Wilhelm Wundt and 1879, the year that is commonly used to mark the founding of Experimental Psychology, would omit a statement of the problem that a *scientific* psychology was meant to solve. Psychology emerges from philosophy, both abstractly, the contents of the inquiry, and concretely, from its people and departments. Why? What was wrong with the contemporary state of the art that demanded new methods? In fact, demanded a new science? One that connected the knowledge, procedure and rigor of physiology, with the bifurcated domain of rationalist and empiricist mental philosophy.

In looking to the stories of Descartes and Locke we see early statements of the rationalist and empiricist positions. We are greeted by questions, such as the one that was posed by Molyneux, that are still generating modern discussion and research. And by picking this time we enter history when it becomes possible to conceive of science *per se.* Prior to Galileo one could argue there was no science[2] .

3.2 2 Philosophers and Psychology

3.2.1 2.1 Descartes (1596 - 1650)

Descartes was a genius and polymath. His inclusion here rests not on the content of his substance dualist claim that mind and matter were two different things, but on the fact that in making this claim he was pulling together the topics of introspective philosophy and physiology. Descartes maintained that matter was physical, and the mind was not. They were two substances (*Res cogitans* and *Res extensa*) yet they interacted. Mind could influence matter and thus thought could determine behavior. In this rapprochement between brain and spirit Descartes presages the creation of a science of psychology which will take thought and its physical basis as its content.

[1] Two textbooks that give reasonably extended treatments of these ancient sources are The Great Psychologists by Robert I. Watson (which can be found very cheaply on line), and Connections in the History and Systems of Psychology by B. Michael Thorne and Tracy B. Henley, which is newer, but more expensive.

[2] A useful question to consider at this stage is whether or not you agree with this statement: Before Galileo there was nothing *we* would call a science. To have an opinion on that you will not only need to know a little bit more about Galileo and what it was he did, but also what is meant by the word science. What makes something justifiably called "a science?" You might find this interview with David Wootton relevant.

Fig. 1: Rene Descartes by Jan Lievens. Downloaded from The Bodleian

Descartes is also relevant for his metaphysics. He famously proposed *Je pense, donc je suis*. I think therefore I am.[3] His method of doubt, and the specific conclusions he reached from employing it may be more pertinent to epistemology, but for scientific psychology they demonstrate the critical use of introspection. Descartes imagined some trickster was deluding his senses. What was it he could believe given the risk of this deceiving demon? We have all been deceived by dreams and illusions - at least momentarily. Given that, is it not possible that all is illusion? That all we perceive is false. That all we know is wrong. No, replied Descartes. There is always something that thinks, and that is constant in its identity across time. I think. Therefore I am. There can be no doubt of this concludes Descartes (and many others). It is an example of the careful use of one's own internal conscious representations and reasonings as the basis for a scientific claim. This will be the method most central to early scientific psychology, and we can take this example of its early deployment as a herald for the scientific psychology to follow.

2.1.1 Some Biography[4]

If the above show how the ideas of Descartes, his rationality and his use of introspection, indicate the science yet to come, we can also see in Descartes' life the practices that would be developed to support all the sciences including psychology.

He was born the son of a sort of lawyer and regional politician. His mother died within a year of his birth, and Descartes was raised by a grandmother. He was deemed sickly. Possibly tuberculosis, and possibly contracted from his mother. He had two inheritances: one monetary and one his intelligence. The latter seems to have been the way he purchased indulgences. Even at a Jesuit school there was a tolerance for his sleeping in and working in bed.

Some words by Descartes about his own schooling.

He acquired a degree in law in Paris. Even in those days guardians were interested in making sure that an education provided you a way to make a living, and also in those days young men and women entertained questions about purpose and meaning. Descartes seems to have had his existential crisis in his early twenties. What good was his knowledge? In his confusion he volunteered for the army[5] , and became a mercenary for Holland against Spanish forces in the

[3] Yet another way in which Descartes was a forward thinker was in writing his science, at least initially, in the vernacular (Galileo did this too). Rather than latin (Cogito ergo sum) his first phrasing of "I think therefore I am." was in French. By writing in his national language he made his writing more accessible to those without a classical background. Paradoxically, this may have made some of his work less accessible to the non-French for whom Latin was the international language of scientific discourse. Of course, one could always relay on breeding. What educated European of the time wouldn't have had at least a basic reading level knowledge of French, German, and Italian?

[4] My own notes on Descartes life are all secondary and acquire piecemeal. I can't recall the sources for most of them. They are just a big pile of facts that I use to lecture. However, Idid find this site that offers a very nice overview.

[5] Wittgenstein too volunteered for the army. What is it with famous philosophers and enlistment? This same website has a nice article about Descartes military experience.

Thirty Years War. While developing and teaching artillery techniques he still seems to have been indulged in a degree of military tolerance. Because it was at this time that he apparently retired to his oven to meditate and in the course of three vivid dreams developed his mental philosophy.

2.1.1.1 Math is the heart of science

With Galileo one first begins to grasp the centrality of mathematics for scientific inquiry. Mathematics was always valued as an intellectual pursuit, and for its practical benefits, but the idea of using mathematics to model the world in the way a globe or orrey does had to wait for the Renaissance.

Descartes is the name behind the Cartesian coordinate system. An accomplished mathematician, Descartes' coordinate system is a component of his revolutionary demonstration of the inherent connection between algebra and geometry. Algebra presents math as formulas. Geometry as drawings. Descartes showed how you could move back and forth. Take your compass and draw a circle on the page of radius r. That image can also be expressed as a function $x^2+y^2 = r$. Work in the "domain" that is most convenient and then convert back into the other. Troubled by a geometric problem? Translate it into algebra. Solve the hard part there, and then translate the solution back into geometry.

These mathematical experiences are key to all scientific inquiry. To study something you must be able to measure it. Mathematizing experience is for Kant the essence of a science, and even if we don't go as far as Kant we can see the idea of trying to quantify experience as a key feature of the nascent struggles to move psychological investigations beyond its idiosyncratic character. Herbart is one of the first to try and give a mathematical tone to psychological theorizing, and it will be Fechner and then Helmholtz who successfully fuse quantification with measurement to generate theories of thought. In Descartes we see the early development of mathematical ideas as providing a dictionary for translating between scientific domains.

2.1.1.2 Interested in the mind? Study the nervous system.

Descartes was an early empirical neuroscientist. Empiricism implies observation, but it is not the same as experimentation, which is both more systematic and more narrowly focused. Early Renaissance science often emphasized demonstration over investigation, but this may have been a necessary early stage. Descartes did get his hands dirty doing real scientific work. He was the first to demonstrate the inversion of the retinal image by the lens. He did this by extracting the eye of an ox and thinning its posterior aspect until it was virtually transparent. Then he could look through this eye to see the image projected on the retina. This is a demonstration you could repeat today.

Descartes was interested in trying to unite his philosophical dualism with his knowledge of the nervous system. In addition to his work in empirical optics, Descartes was also a student of reflexes. Touch something hot and you pull back before you are aware of having thought about it. Descartes was of the view that reflex mechanisms were sufficient to account for all the complexity of animal behavior[6] . In coming to the conclusion that reflex mechanisms were sufficient to explain complex behavior, Descartes was clearly a product of his time[7] . In the 1600s great progress was made on mechanization. Little machines were made that followed determined mechanical rules implemented by wheels, cogs, and springs that often produced, via the composition of such simple mechanisms, apparently complex behavior such as the duck that would eat, drink and defecate. Descartes probably witnessed the operation of the Latona Fountains where a complex system of levers and pipes led to triggered reactions and responses, and also the automata of Saint Germain. An example of the potential complexity of these mechanical creations and their ability to mimic animal behavior can be seen in this video of singing bird pistols.

2.1.1.3 Denouement

Descartes, like many of his contemporaries, had to fear retribution for his scientific ideas from the Catholic church. A mechanical account of behavior could be seen as antagonistic to religious teachings. And, along with others of his

[6] In a way one could see the behaviorism of the early 20th century as a continuation of the Cartesian program, but this time expanded to include humanity along with the brutes.

[7] What does the word Zeitgeist mean?

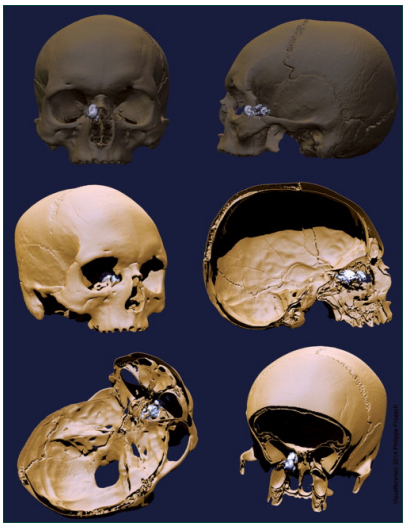

Fig. 2: The skull of Descartes. Downloaded from The Lancet

contemporaries (e.g. Locke) he took refuge in Holland. The Dutch were relatively free thinking and tolerant, and played host to many scientists potentially exposed to accusations of heresy.

To provide himself a home and a salary Descartes contracted to tutor Queen Christina of Sweden. Christina was an educated woman when that was rare and royal females were treated more as sexual bargaining chips. She was also, unfortunately for Descartes, a believer in early hours and possessed a robust constitution. Descartes did not, and it was not too long after wintering in Sweden and arising at 5 am that he died of pneumonia.

His accomplishments though bred fame, and the French ambassador cut off a finger of Descartes corpse for a souvenir. A lead casket was sent from France to return the great man's remains, but being too short they left his head behind. Fortunately it has been found (since 1821).

2.1.2 Lessons for Scientific Psychology from Descartes

From ancient times the mind of man was linked with his spiritual aspect, that is his soul. When empirical practices were more widely adopted, and combined with improved practical technical skills the arts and sciences flourished in what we call the Renaissance. In this milieu a person of Descartes great intellectual ability could contribute to multiple fields including math and neuroscience. He could also elaborate a view of mental philosophy that provided a rational argument for ones' mental existence, and he could also provide a paradigm in which the mental and physical were separate, but interactive so that both a knowledge of the nervous system and a knowledge of mental structure would be necessary for a complete understanding of human psychology.

We can also learn the lesson of humility. Despite his greatness Descartes made obvious mistakes. Mistakes not only obvious with hindsight, but mistakes that should have been apparent to him if he had not been driven by the need to confirm his opinions, but rather to test them. Having decided that mind and brain were two distinct, but interacting, substances he felt compelled to offer details of their communication. His hydraulic account of muscular action is not too implausible. Muscles seem to swell when used, perhaps they become engorged by some routed fluid he proposed. Given the hydraulic fountain and automata of his day that seems a reasonable conjecture. But where did the control of these fluids come from, and how could this non-physical mind interact to direct this physical flow? Descartes persisted in pushing his hydraulic account ever higher until we are forced to consider minute lacunae (too small to be observed) that are affected by minute (too small to be observed) vibrations of a central cerebral structure, the pineal gland, which seems to have been selected based more on aesthetic considerations than rational ones. The pineal gland was the location where mind influenced brain, and from whereon all was physics and fluids. But if the pineal gland is the special organ of thought, and if only man (and none of the lower animals) possess this faculty then there should be no particular reason to find pineal glands littered about in all the mammals, including oxen, the exact creatures

that Descartes dissected to procure his eyes. He knew the animals had pineal glands, yet he omitted to confront this challenge to his account.

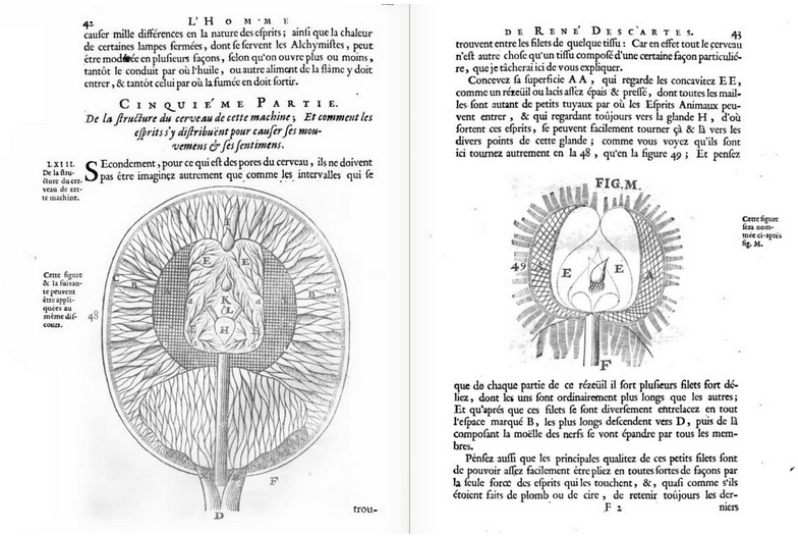

Fig. 3: Descartes depicts the pineal and its fluidic vibrations Downloaded from Treatise on Man Archive.org

2.1.3 tl;dr Descartes

Rene Descartes links the mind to the brain through his philosophy, analysis, and empirical investigations of the nervous system. His rational, dualist account can be seen as one side of the philosophical coin from which a scientific psychology will develop.

3.2.2 2.2 John Locke (1632 - 1704)

2.2.1 Some Biography[8]

Similar to Descartes, Locke had lawyers in the background. He was middle class, and it was through patronage that he could attend Westminster school. Locke's father had fought on the side of the Puritans, and it is possible that Locke may have witnessed the beheading of Charles the First. Ability came to his aid and he was able to attend Oxford on scholarship.

Locke studied medicine. Several of the founders of scientific psychology were medical men by training, if not by practice. For example we will see that Helmholtz, Munsterberg, and Broca, among others, were trained as medical men first. Some of this was probably an artifact of the education system of the time, but it is also interesting to wonder how the early approach to psychology as a science might have been shaped by this clinical perspective and training, and why then, apparently paradoxically, what we consider as "mental" illness was not a popular topic for psychological research? Although, Kraepelin, the father of modern psychiatry, was Wundt trained, he was not practically speaking an experimental psychologist.

2.2.1.1 Discussion Question

> Why should it be the case that so many early scientific psychologists would have been trained in medicine when, as we shall see, very little of early scientific psychology had anything to do with clinical care?

[8] The Stanford Encyclopedia of Philosophy (an excellent resource) has a nice biography of Locke.

It appears that Locke may have been a bit of a dilettante mingling his interests in natural philosophy with those of politic philosophy. His medical training took place at a time when there was a move away from didactic education to practical training. It may seem odd now, but one once learned how to practice medicine by reading books in Latin. But the years of political upheaval and unrest in England provided some diversion and allowed for new developments in medical education. Thomas Willis[9] was the apparent founder of this approach to be more practical and empirical in medicine. This approach may have appealed to Locke and informed his views more generally. At the time Locke was being educated and working British science was also institutionalizing. The Royal Society was founded in 1660.

For Locke personally, it appears that his future was secured when he assisted in the successful drainage of the liver cyst of Lord Ashley (1668). An interesting side note is that the Lord wore a silver drainage tube thereafter. We know know that metallic silver has antimicrobial effects, and this could have contributed to the longevity and success of the surgery.

Perhaps courageously, perhaps unwisely, Locke chose a time of civil war and beheaded kings to write a rather opiniated treatise on government. And as a result of the these turbulent times Locke decided it was worthwhile to find somewhere other than England to live and work for awhile. He decided on Holland (as had Descartes). Following his return from exile Locke published An Essay Concerning Human Understanding[10] , which is what we can take to be one of the important antecedent documents for what will become a science of psychology.

Locke's last years did not have the drama of Descartes, but they both shared discomfort in the end. Locke had some sort of lung disease that made it difficult for him to bear the air of London in any but the better months of spring and summer. He died in 1704 and was buried in Essex.

2.2.2 Lessons for Scientific Psychology from Locke

Locke's empirical approach to mind is echoed by the philosophers, such as John and James Mill, who will argue for a *science* of the mind, and emphasize on sensations and images as the core materials from which a mind is built. This notion of simple elements combined to make complex mental constructs is not an accidental metaphor. The first true theoretical movement in scientific psychology will be *structuralism*.

This contrast of Locke's nascent structuralism with Descartes rationalism is useful for examining many issues in contemporary psychology.

2.2.2.1 Discussion Question

> Locke's philosophy is called empiricism. What is the difference between empiricism, positivism, and experimentalism?

One of Locke's most important points for scientific psychology is one of the first ones he makes in his Essay.

> Let us suppose the Mind to be, as we say, white Paper[11] , void of all Characters, without any *Ideas*; How comes it to be furnished? Whence comes it by that vast Store, which the busy and boundless Fancy of Man has painted on it, with an almost enless Variety? ... To this, I answer, in a word, from *Experience*; Book II

2.2.2.2 Discussion Question

> How does this position differ from Descartes'?

[9] Thomas Willis is often thought of as the founder of neuroscience. He probably rendered the first clinical description of myasthenia gravis, and really impressed the locals when he appeared to bring a woman back to life. That is a great advertisement for a physician. But mostly his advances seem to have rested on his documentation of the cases he saw, his collation of similar cases, and his continuity in seeing what happened to his patients over time.

[10] There are several copies of this on the archive.org website. This one has a nice picture of the author and looks impressively old.

[11] Although it is incredibly common to refer to Locke's claim as saying that the mind was a *tabula rasa* (or a blank slate). That terminology actually comes from Aristotle's *De Anima*.

This furnishing according to Locke comes because we observe outside things and inside things. The outside things are the things in the world, rocks and the like, while the inside things are our own thoughts and ideas. The former might be called sensations, and the latter reflections. There are simple ideas and complex ideas the latter being made from the former. The sensations we have of objects can inhere in the objects themselves, such as their position, and such sensations are primary, but our sensations can also be secondary by virtue of depending on us. The color of the rock is not inherent in the rock, but comes from my observation of it.

See how Locke's ideas merge with our modern idea of what it means for something to be a science. Scientists observe. For Locke our minds are the products of a process of observation combined with a capacity for reflection. There is nothing there aught what experience puts into it. Because the mental is derived from the physical some obvious and strong predictions can be made.

2.2.2.3 Writing Assignment - Molyneux

Do you understand?

Write about *Molyneux*

2.2.3 tl;dr Locke

Where Descartes represents the rational approach to human psychology: we are thinkers who can rely on native dispositions to deduce true states about our mental life; Locke represents the empiricist counterweight. He are born with no native ideas. We are blank and then stamped by simple sensations that we elaborate through experience and reflection into ever more complex mental constructions.

2.2.3.1 Discusion Questions

1. For Locke there are two sources of knowledge. What are they?
2. What distinguishes a simple idea?
3. Was Locke a behaviorist?
4. What are some arguments against the blank slate theory of human knowledge (and what is the philosophical term that describes the study of the limits, nature, and origin of human knowledge)?
5. What is the difference between a primary and a secondary quality?

3.2.3 2.3 Other names - Other stories

The selection of Locke and Descartes to anchor the story of experimental psychology's beginning has the purpose of highlighting and emphasizing two different background ideas that we can see throughout psychology's history, but it is of course absurd to suppose that only these two men were relevant for the beginning of a scientific psychology. The following are a few more of the interesting names and personalities that also inform psychology's origins.

2.3.1 Auguste Comte: The brain is the organ whereby dead people act on living ones

The founder of positivism. While he stands with Locke on the fact that observation and verification are keys for scientific knowledge this leads him to argue that a scientific psychology is impossible because the mind cannot observe itself.

2.3.2 George Berkeley: To be is to be perceived

An Irish philosopher he is classically linked with Idealism. That is, we have no reason for believing that what we perceive in fact accords with real things that are "out there." What is real are only our perceptions. Berkeley is a brilliant and interesting character, and his work on depth perception was technically fine. Among other activities he tries to found a college in Bermuda. Some suggest that he was encouraged in this goal as a means of getting rid of him, which may explain the decline in support for the project after he disembarked, and why he then got stuck in Rhode Island and why his library ended up donated to Harvard and Yale. The University California school "Berkeley" is named after him. And he inspired one of the best known efforts to refute a philosophical idea by brute force.

2.3.3 David Hume (1711 - 1776)

Scottish. Hume goes even further than Berkeley to deny that we can really know much of anything. Even the law of cause and effect is really simply inferred from experience. Hume places great emphasis on the association of ideas, resemblance, and contiguity. It might be profitable to Hume with Aristotle's ideas on association and to then look at the memory work of Ebbinghaus for a potential application?

2.3.4 Immanuel Kant (1724 - 1804).

A German who spent his entire life in Königsberg. For reasons I never understood the fact that he was celibate is frequently mentioned, and just to perpetuate the mystery I include that fact here. He lived a very regimented life. His philosophy can be seen as a response to radical empiricism. Kant argues that some things (especially the concepts of space and time) are known a priori. Only those sciences that can be deduced from a priori concepts and mathematized, like physics, can be real sciences. Therefore Kant joins a long line in suggesting that, therefore, psychology cannot be a science (but then again neither can chemistry). Kant did admit a notion of an informal science, like anthropology that we might recognize more like psychology.

2.3.5 Julien Offray de La Mettrie (1709 - 1751)

Born in St Malo just like Jacques Cartier (this means something to Canadians). Another physician de La Mettrie takes an important step towards seeing our mental life as the result of biological processes. This drew on his personal clinical experience of a delirium from fever. He also challenged Descartes on the importance of any qualitative separation in the mental character of animals and man. He felt so strongly that he offered to turn a monkey into a little man about town. And, in what seems to me an appropriately extravagant and French ending, he died from eating too many truffles.

2.3.6 David Hartley. (1705 - 1757)

He was a minister's son. When you look at early psychologists and scientists those who were not educated as MDs often seem to have been the sons of parsons. Why is that? In any case Hartley disagreed with church doctrine on eternal damnation and so decided to become a doctor instead. Hartley rejected Descartes notion of hollow tubes as the basis for neural communication and substituted instead the idea of vibrating strings. Think of what happens when you pluck one string of an instrument - you often see the others vibrate in resonance. This could be taken as a very early precursor to the ideas of oscillations in the nervous system? Continuing the same analogy of the vibrating string, after you pluck it it takes a while to fade away. Now imaging looking at a candle and then close your eyes. You see an after image that gradually fades away. The experience of the after image is very popular for early psychology. It is an example of a sense impression, or a perception, in the absence of an explicit physical stimulus and thus it posed a real puzzle for early psychological theorists. For example, D'Arcy swung a hot coal in a circle and used its fusion into a circle to estimate neural processing time. There is also a long line of very smart people injuring themselves studying after images (Isaac Newton; Gustav Fechner; Kenneth Craik).

2.3.7 Alexander Bain (1818 - 1903)

We are getting to more recent times now. Bain was of poor origin, and worked his way up and out of a Scottish textile mill by teaching himself Latin and mathematics. He managed to support himself through college by his writing. He founded one of the first psychology journals: Mind; though we might regard it today as more philosophical than scientific. Like Hartley he develops a psychology based on physiological principles and even begans to move from arm chair philosophizing to making empirical observations. His study of suckling lambs is a famous example.

3.2.4 2.4 Question for Review, Discussion, and a Scavanger Hunt

1. Make a case for whether Locke or Descartes should be considered the first true psychologist?
2. How did Locke and Descartes differ in their opinions on the source of all knowledge?
3. For Locke what is the difference between sensation and reflection?
4. Why is the work of *empirical philosophy* relevant for the development of scientific psychology?
5. What was the date and who was the author of the first North American textbook of Psychology?
6. What is the difference between science and empiricism?

CHAPTER 4

Wilhelm Wundt

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      - *1.1.2 Founding*

4.1 1 Stub

4.1.1 1.1 Wilhelm Wundt

1.1.1 Brief Biography

1.1.2 Founding

CHAPTER 5

Psychophysics

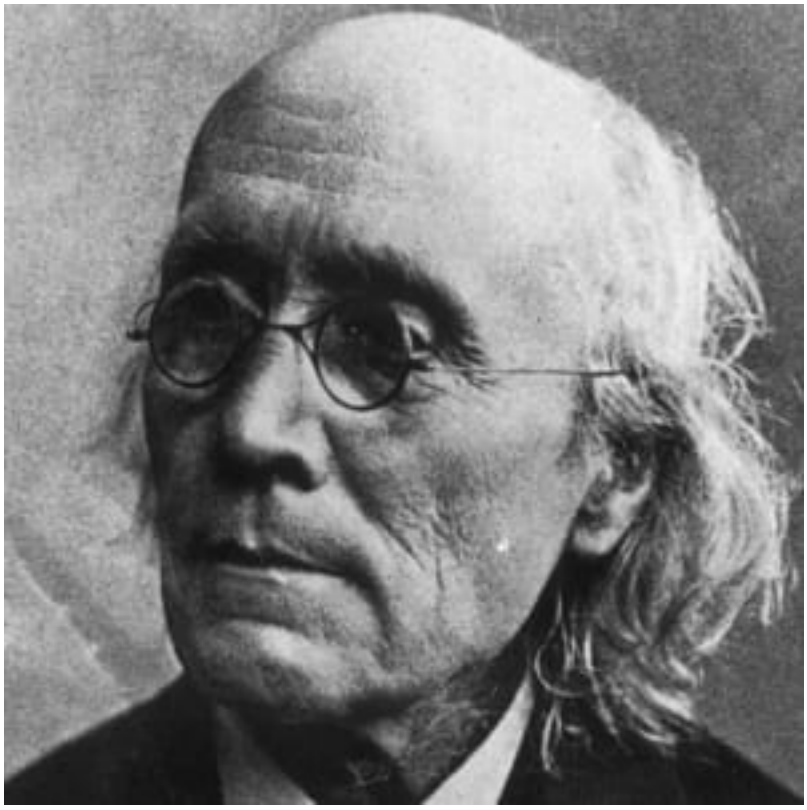
5.1 Gustav Theodor Fechner

Authors: Sukhmani sengar, Andrea Cretu, Manvir Singh Judge, Gulay Emin, Eden Barr, Carter Little

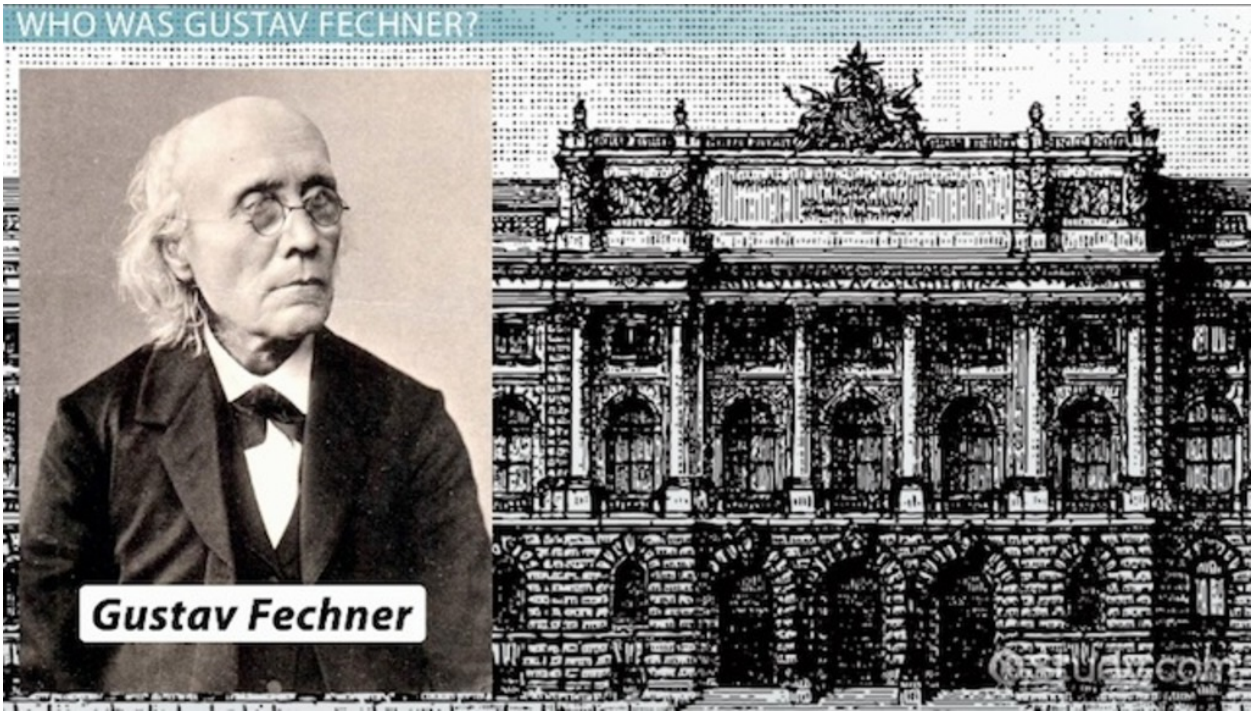
December 14th, 2018

5.1.1 Abstract

Gustav Fechner was born in a small town in Germany where he graduated from medical school ("New World Encyclopedia," 2017). He was interested in physics and later on was known as the founder of psychophysics. He has underlined the key concepts of physics through his research and by becoming a professor at the University of Leipzig in Germany. Between the many published books and articles, a contemporary book, "The Elements of Psychophysics" is well perceived as the study of the relationship between physical stimulant and mental response. The book portrays his new theories that are discovered and based on physics. His work is still studied today to understand the experiments and thoughts he had once found and displayed. While he continued conducting new studies and teaching, he experienced an eye illness which resulted in a long period of bed rest. Once Fechner was able to recover, he connected himself to God and began to study philosophy. At last, Fechner became closer to philosophy and continued to pursue this passion through books and lectures.



5.1.2 Biography



University of Leipzig, where Fechner both studied and taught for numerous years

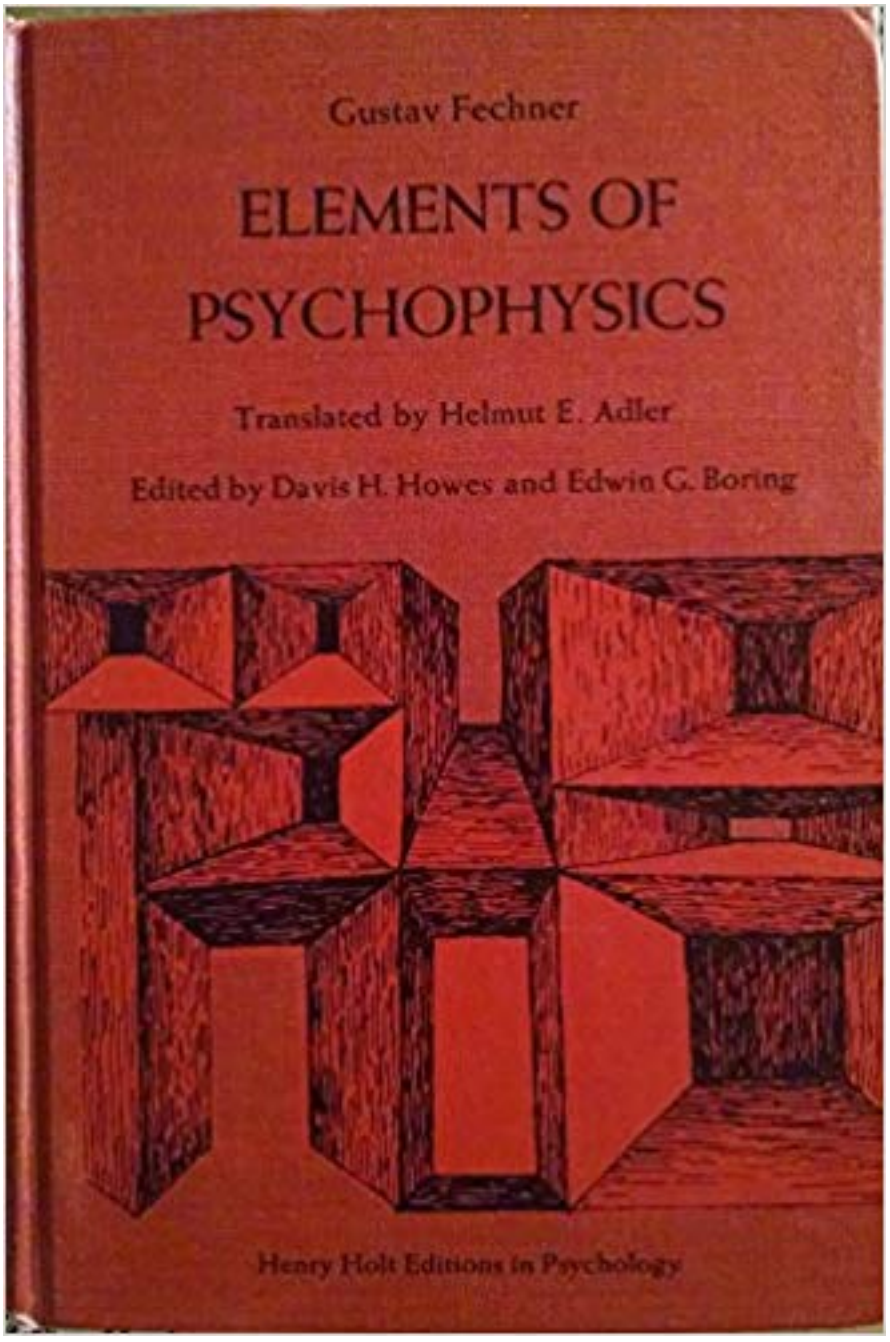
Gustav Theodor Fechner was born in a village in Gross Särchen, Germany on April 19,1801 ("Encyclopedia Britan-

nica," 2018). His father died when he was young. Later on, Fechner enrolled himself in the university of Leipzig in 1807. He had received his medical degree in 1822 but decided not to pursue medicine, instead began to write satire ("New World Encyclopedia," 2017). He later invested his interest in mathematics and began to study physics. After being knowledgeable in his work, he was known as a German physicist and philosopher who was a key figure in the founding of psychophysics. He published his own books related to psychology and physics.

In 1834, within a year after his marriage, Fechner was appointed as a physics professor at the University of Leipzig in Germany (McGill, Moose & Rehn, 1999). Several years after being a professor, he developed health issues as he began to experience more than usual exhaustion. In 1839 he fell ill with an eye illness of partial blindness due to his frequent gazing at the sun during one of his studies (McGill, Moose & Rehn, 1999). Fechner was isolated and off work for a few years due to which depression followed him.

By 1842, he began to recover and soon after he started to study philosophy and discussed the idea of consciousness ("Encyclopedia Britannica," 2018). Later on, Fechner reached to experimental aesthetics where he determined what shapes and sizes were aesthetically most pleasing ("Encyclopedia Britannica," 2018). From here on, he spent most of his time doing public lectures and later on he died at the age of 86 in November 18, 1887 ("Encyclopedia Britannica," 2018).

5.1.3 Published books and the Importance of Elements of Psychophysics


Gustav Fechner
ELEMENTS OF
PSYCHOPHYSICS
Translated by Helmut E. Adler
Edited by Davis H. Howes and Edwin G. Boring
Henry Holt Editions in Psychology

Element of Psychophysics, Written by: Gustav Fechner

Gustav Fechner can be considered an important individual in psychology as well as physics and philosophy for his work with psychophysics. This finding can be described to be the quantitative relationship between a physical stimulant and the mental response and sensation. ("New World Encyclopedia," 2017) Psychophysics will be explained further into detail later. Much of his research and time as a physicist was spent studying this theory and further developing it. As Fechner concluded his work associated with psychophysics he published various papers to explain and support the developed theories.

During his time, Fechner had written various prevalent papers to accompany his findings, the most notable being,

"Elemente der Psychophysik, 2 vol (Elements of Psychophysics)". This book was first published in 1860, establishing the importance of experimental psychology and creating the first view and explanation of the theory of psychophysics. The published book created a name for Fechner in the field of psychology as he was accounted as one of the founders of modern experimental psychology. ("Encyclopedia Britannica," 2018) His research not only developed a new theory but allowed the field to be studied in a way never experienced before; experimentally and quantitatively. Procedures in psychology using experimental and quantitative techniques he developed are still used today. In the book, Fechner included an equation to aid his explanation of psychophysics, more specifically the theory of just-noticeable differences. This theory was originally created by Ernst Heinrich Weber and further developed by Fechner. ("New World Encyclopedia," 2017) His work with psychophysics helped the field of psychology be understood not only as a qualitative but also quantitative science.

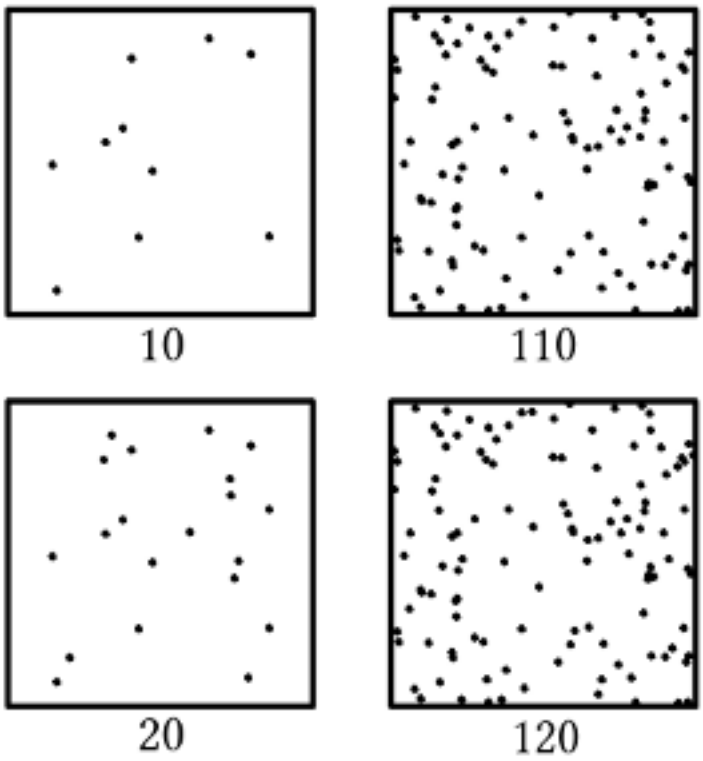
As Fechner further delved in his findings, he continued to publish papers to follow his findings. Some additional papers include, Vorschule der Aesthetik in 1876, which explained the basic principles of art, Das Büchlein vom Leben nach dem Tod (The Book of Life After Death, 1836), Uber die physikalische und philosophische Atomenlehre (The Physical and Philosophical Atomic Doctrine, 1855) and more. ("New World Encyclopedia," 2017)

5.1.4 Key Accomplishments

Fechner conceptualized that mind and body, though appearing to be separate articles, are actually different sides of one single reality. He also advanced experimental procedures which are still useful in experimental psychology for measuring sensations in relation to the physical magnitude of stimuli. Philosophically Fechner defended a monism in which the one world can be seen in one way physically and in the other mentally ("Encyclopedia Britannica," 2018). Experimentally he sought to confirm this vision by discovering close quantitative relationships between conscious experience and physiological stimulus, as a result, discovering the law that the intensity of a sensation increases as the log of the stimulus conceptualizing psychophysical relations. This law proved the existence of evidence-based connection between body and psyche. This formula was named the Fechner-Weber law, because it based on the theory of the just-noticeable difference, advanced earlier by Ernst Heinrich Weber. He developed experimental procedures for measuring sensations in relation to the physical magnitude of stimuli ("Gustav Fechner," n.d.). He proposed the three methods of measurement were the method of just-noticeable differences, the method of constant stimuli, and the method of average error. According to the authorities, the method of constant stimuli, called also the method of right and wrong cases, has become the most important of the three methods. In philosophy he was also an animist, maintaining that life is manifest in all objects of the universe. Fechner called his conception Day Vision, unlike his contemporary materialism – Night Vision ("Markov, S." 2018, September 30). His greatest achievement was in the investigation of exact relationships in psychology and aesthetics. He demonstrated that since the mind can be measurable and understood mathematically, it is possible calculation in psychology. He hoped to organize psychophysics and metaphysics in a way that united philosophy and the human sciences. In 1865 Fechner's interest turned to the study of the basic aesthetic principles of art ("Gustav Fechner" 2014, April 02). Fechner's experimental method became the basis for experimental psychology and later inspired Wilhelm Wundt, who created the first scientific Psychological laboratory.

Sigmund Freud regarded Fechner as the pioneer of psychophysics and a founder of scientific and experimental psychology. He attended Fechner's lectures in Leipzig in 1874. He gave him him the title "The great G. T. Fechner." William James, who did not care for quantitative analysis or the statistical approach in psychology, dismisses the psychophysical law as an "idol of the den," the psychological outcome of which is nothing ("Markov, S." 2018, September 30).

5.1.5 Psychophysics and the Different Experiments Done in Order to Prove Physical Stimuli and the Mental Aspect of Psychology



Above is an example of the Just-noticeable differences explained by the Weber-Fechner law. In the picture, there are four images containing different amount of dots. The bottom two pictures have 10 additional dots than its the corresponding picture from above. Between the left two pictures, where the images have 10 and 20 dots respectively, there is a visible difference. In contrast, on the two pictures from the right, the pictures contain 110 and 120 dots. When comparing those two images they look almost identical at first glance. This illustrates a just noticeable difference which is explained in the section below. Image retrieved from Wikipedia.

Gustav Fechner did not have your typical scientific 'upbringing'. Most scientists experiment with other and work together with teams in order to further their research and findings. After an accident where Fechner almost essentially blinded himself for research, he isolated himself from society for approximately three years, this is when he made his largest discovery of psychophysics (Markov, 2018). His initial curiosity began with philosophy, he believed that mind and matter are the same thing, rather than 'mind vs matter'; this was his main solution for the ultimate philosophical problem according to Fechner. His hypothesis for this solution was "mind and body are not regarded as a real dualism, but are different sides of one reality" (Eval, 2018). Psychophysics is essentially the study of the relationship between mental experiences and physical stimuli (Eval, 2018). Fechner had taken Ernst Weber's discovery of the extent of magnitude of one specific stimulus results in a noticeable change in sensations. Fechner applied Weber's law to his research and finding, connecting them to the measurement of of sensations related to to a stimulus (Markov, 2018). This is what we now call the 'Fechner - Weber Law'. This law both helps quantitative psychologists and philosophers withy the belief that the measurement of sensations are in relation to a measured stimulus (Eval, 2018). He came up with three different methods of measurements; just-noticeable differences, the method of constant stimuli, and the method of average error (Eval, 2018). Surprisingly enough, Fechner did not do any initial experiments per say in order to come up with his theory, he simply dreamt it and then pursued it. Ten years later, he wrote his book 'Elements of Psychophysics" which explains his theory more in depth.

After many hours of research, it was very difficult to come across experiments that Fechner had done in order to help prove his hypothesis and findings. This may be due to the fact that he started with a philosophical view, which then

he was able to connect to different aspects of physics in which he was teaching. His methodology conflicted with pure data that should have been done in order to prove his hypothesis and ideas more clearly. The correlation however to psychophysics and physical stimuli and the mental aspect of psychology has to do with the fact that they all relate to how much of a stimuli we can detect and how we can then detect the differences between stimuli in the environment with our sensory systems, including vision, auditory, taste, smell, and pain (Eval, 2018). An example of this being eating a nice cold watermelon on a hot summer's day. The sensation of eating this good, cold watermelon then relays back to our brain which essentially what psychophysicists have been wondering. The relation between something we are doing and the different processes that can occur as a response.

5.1.6 Contemporary Assessments on Fechner's Impact

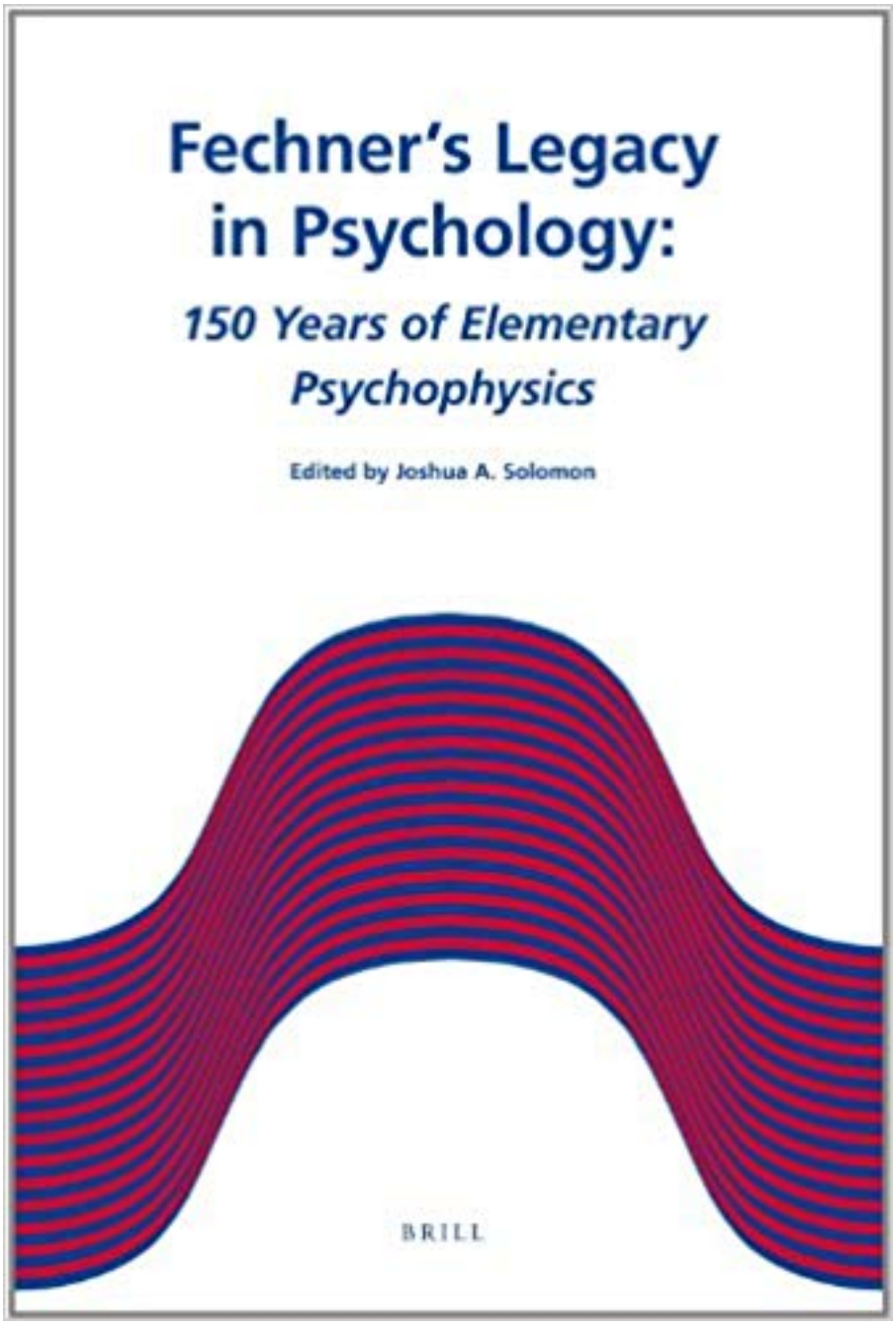
In modern times, multiple psychologists have looked back on Fechner's work and discussed his crucial importance to the development of the field. Many articles have been written which discuss his impact as well as what has become of psychophysics since the era of Fechner. The article "The Place of Psychophysics in Modern Neuroscience" by J.C.A. Read of the Institute of Neuroscience at Newcastle University discusses where psychophysics has gone since Fechner, as well as if the work of early psychophysicists and their ideas are still relevant. Read argues that while the small groups of human subjects generally used for psychophysical studies may seem to come up with unreliable results, it is still just as important to study humans as it is to study animals (which has become a common practice since the creation of psychophysics because multiple subjects can be used). The article also discusses technological advancements and how they have and can further the role of psychophysics and take research beyond where it has ever been before. The invention of technology such as computers has helped early psychophysical ideas become modernized and be improved for use in modern psychophysics. Read states that early ideas of human psychophysics are not without their issues. For example, early psychophysics generally focused on judgements that were restricted to small sets of quantitative data, which don't necessarily display the full picture of how the human brain interacts with physical stimuli. Despite this, Read does believe that the ideas of early human psychophysics are still of relevant in the world of psychology and neuroscience today (Read, 2015).

Another article, "Fechner: 150 years of Elemente der Psychophysik" by David K. Robinson, celebrates the 150th anniversary of Fechner's revolutionary book on psychophysics. Robinson discusses the sheer importance of Fechner in not only the creation of psychology but also it becoming known as its own science. After Fechner's work, other scientists began to take their own steps, using Fechner as inspiration, to further this new branch of science. Wilhelm Wundt, inspired by Fechner, opened up what is known by many as the first ever psychology lab, with psychological study being its sole purpose. Fechner's law and methods for psychophysical measurement have been used by scientists studying psychology ever since the publication of Elemente der Psychophysik (Robinson, n.d). Even to this day, Fechner's importance and influence can be seen in most psychological work.

5.1.7 Contemporary assessments on Gustav Fechner

Fechner had a large contemporary impact on psychology. His work and influence can be seen throughout psychology; however, it can be argued that his influence is far more methodological than theoretical, as most works tend to be from other historical psychologists. This made finding contemporary assessments on his work incredibly difficult. Although much research was conducted on the psychologist, finding notable, and relevant articles throughout the databases we learned about in class and also through additional databases posted on Waterloo's Library website was unsuccessful. Two appointments were made with one of the librarian liaisons, (library assistant) who specializes in psychology. The librarian attempted to go through the databases in the similar ways tested before, albeit far more efficiently and extensively. Although again no major articles to reference were found. Despite little to no success, an abundant amount was learned about navigating the databases and also how to sign out books which in regards to this assignment included, Life After Death, written by Fechner. Unfortunately, the book, although seeming quite promising, was of no help.

Assessment aside, Fechner's work definitely had a large impact on the psychology community. Although not overtly discussed, fechner's work with the Weber-Fechner law, quantifying perceived change in stimuli compared to the actual mathematical representation of said change, is likely his most commonly used psychological contribution. The law


Fechner's Legacy in Psychology:
150 Years of Elementary Psychophysics
Edited by Joshua A. Solomon
BRILL

is still used today as a common source of data and as frequently been used to support theories. The law has been questioned and debated by many psychologists overtime. In a rather recent article, published by Elsevier Science, (The neural basis of the Weber-Fechner Law: a logarithmic mental number line - 2003) uses studies based on number neurons to contradict the linear calculations of relative stimuli that uphold the Weber fechner law. The article declares that the calculations are more accurate when done logarithmically rather than linearly as Weber had suggested. This criticism of weber's theory actually supports fechner's interpretation of the law.

Some of his other large contributions are methods of constant stimuli, methods of bisection and related psychophysical tools.

5.1.8 Intro to the Life and Work of Fechner: Video

Below you will find a 4 minute video; including important details regarding Fechner's life and work. Is is aided by visuals, and a concise summary voiced as an addition to better your understanding

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5.2 1 Another great of psychophysics (stub):

5.3 1.1 Ernst Weber

CHAPTER 6

Physiology

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- *Physiology*
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    - *1.3 Paul Pierre Broca*

6.1 1 Stub

6.1.1 1.1 Johannes Müller

6.1.2 1.2 Hermann v. Helmholtz

6.1.3 1.3 Paul Pierre Broca

Contents:

Pierre Paul Broca

Authors: Fatima Muni, Mumbi Gitau, Fatma Turker, Benjamin Crouch

Date: December 15, 2019

Fig. 1: Pierre Paul Broca

Paul Broca

Abstract

The purpose of this paper is to provide the reader with a good understanding of the famous French physician Pierre Paul Broca. Born in France in the year 1824, Broca made multiple concrete conclusions to his theories, making him a significant individual in the scientific community. During his studies, he put a lot of his focus and efforts on the human brain, considering the fact that he is most well known for finding Broca's area and Broca's aphasia. During his time, Broca was an intelligent man that succeeded in multiple areas of his work, even though some of it did take on a racist approach. In this paper, we give an overview and discuss Broca's life and work, and the various accomplishments that he made throughout his career.

Early Life & Education:

Pierre Paul Broca was born in a small commune in southwestern France called Sainte-Foy-la-Grande on June 28, 1824. He suffered a stroke at the age of 56 and died in Paris on July 9, 1880.

He is most remembered for his contribution to the understanding of the brain. His study of brain lesions allowed him to discover the area of the brain connected to speech, which is now known as "Broca's area". His studies also contributed to the understanding of aphasia, and through his thorough study of aphasic patients he provided the first proof of the localisation of brain function.

Broca's studies were encouraged by his family which consisted of his father, Benjamin Broca, a medical practitioner, and his mother, Annette Broca, who was known for her sharp intelligence.

He accomplished a basic education in Sainte-Foy-la-Grande, and at his local university he studied both mathematics and physical science. He first earned a bachelor's degree in history and literature and then moved on to earn a degree in science and mathematics. At the young age of seventeen he attended medical school in Paris graduating at the early age of twenty.

While at the university of Paris his mentors included: Philippe Rocord, Francois Leuret, and Pierre Nicolas Gerdy, which meant that Broca made the most of his time in medical school by establishing himself in the scientific world at a young age. The work he did along side these established scientists opened up many opportunities for Broca, and the surgeons and anatomists that he worked under helped teach and mentor him on ways of the scientific world. He was the founder of the Modern Anthropological School, which aimed to study the history and origins of man and the different transformations that have taken place throughout all of the ages and revolutions of our world. After graduating medical school he moved on to be a professor in the faculty of medicine.

At the age of 24 he began to get recognised for his contribution to the understanding of the limbic system, and he even started receiving awards and high positions due to his skills as an anatomist.

In 1868, he became a professor of clinical surgery and was elected as the chair of Clinical Surgery. He held this position until his death in 1880. While he was the chair of Clinical Surgery, he worked in many hospitals in Paris, including; St. Antoine, the Pitie, des Cliniques, and Necker.

Sainte-Foy-la-Grande

A short video on Broca's Scientific Contributions

Professional Activities:

Paul Broca's professional career started when he graduated from medical school in 1844. He was a scientist with an impressive medical career, a life-long research experience, significant contributions to Anthropology, and extraordinary thoughts.

Paul Pierre Broca had multi-internships on urology, dermatology, psychiatry, anatomy, and surgery. In 1853, he became a professor (Sagan, 1934, pp.6-10) and won the title of the surgeon of the hospitals (Ekbal, 2019, p.89). His contributions to cancer and aneurysm, neuroanatomy, neurophysiology, neuropathology on the speech center and limbic lobe are important (Schiller,1979, p.VII). The hands-on learning style of medical education at that time might have influenced him (Gere, 2013, p.201). His occupation as a surgeon made his way to autopsy people's brains who were suffering from speech disorders.

In terms of his research, his studies were originated from his involvement in "Society Anatomique de Paris" where he was very productive. Schiller (as cited in Wikipedia, 2019) stated that he contributed to understanding muscular disorders in addition to his 250 separate medical contributions (para.19). His research experience brought him to study Anthropology. In 1859, he founded the Society of Anthropology (Gere,2013, p.204). Broca (as cited in Wikipedia,2019) advocated the idea of polygenism which claims that each racial group comes from a different origin (para.21). Consequently, he had to say something about hybridity. Broca (as cited in Wikipedia, 2019) concluded that the result of reproduction between the two groups varies. Offsprings might be infertile, they may be infertile between themselves but could be fertile with the parent group, or they might even be fertile both between themselves and with the parent group,whereas the reproduction rates are subject to decline until it vanishes. The only successful variation is known as Eugenesic which is fertile. According to him, the French were an example of a eugenesic mixed race (para.24).

In the Society of Anthropology, discussions were focused on language, head shape, and race which would lead the discussions about brain size and intelligence in 1861(Gere, 2013, p.204). Ashok (as cited in Wikipedia,2019) stated that Broca thought brain size was not the only indicator of intelligence. He developed different terminology and instruments to support his points. For example, "cephalic index shows the relationship between the brains' length and width, that was directly proportional with intelligence". He concluded that the most intelligent European group was 'long-headed' (para.28).

Broca combined anthropology with medical research and practice, especially with neurology (Science Museum, para.1). He did not only study craniology, but wrote five volumes about the relationship between the size of the skull and intelligence (Gere, 2013, p. 206), Frank said (as cited in Wikipedia, 2019) he also designed different instruments such as a stereograph to reach a scientific approach to measure human physical features (para.27).

Stereograph

His thoughts were parallel with Charles Darwin's theories. His quote 'I would rather be a transformed ape than a degenerate son of Adam' was a cause for conflict between him and the church (Wikipedia, para.5). He was against the slavery and colonization since he thought they would pose a threat to the native populations (Wikipedia, 2019, para.25). As Sagan (1934) stated "Broca was a humanist of the nineteenth century, but unable to shake the consuming prejudices, the human social diseases of his time. He thought men superior to women, and whites superior to blacks" (p.11).

Significant Contributions/Discoveries:

Best known for his role in the discovery of particular capacities in the various parts of the human brain. In 1861, Broca showed that the loss of capacity for speech was associated with damage to a particular portion of the brain. This area later became known as Broca's convolution. His research also contributed to addressing questions related to the evolution of human language. Broca has contributed with discovering one part of the puzzle of the transmission of human culture. There are also his contributions to the field of physical anthropology. Craniology, or the scientific measurement of the human skull, was of major importance at the time, and Broca contributed by inventing roughly twenty seven different instruments for the measurement of all parts of the human body, as well as developing and standardizing a multitude of techniques of measuring. Broca is also credited with the founding of the first anthropological society in the world, in 1859.

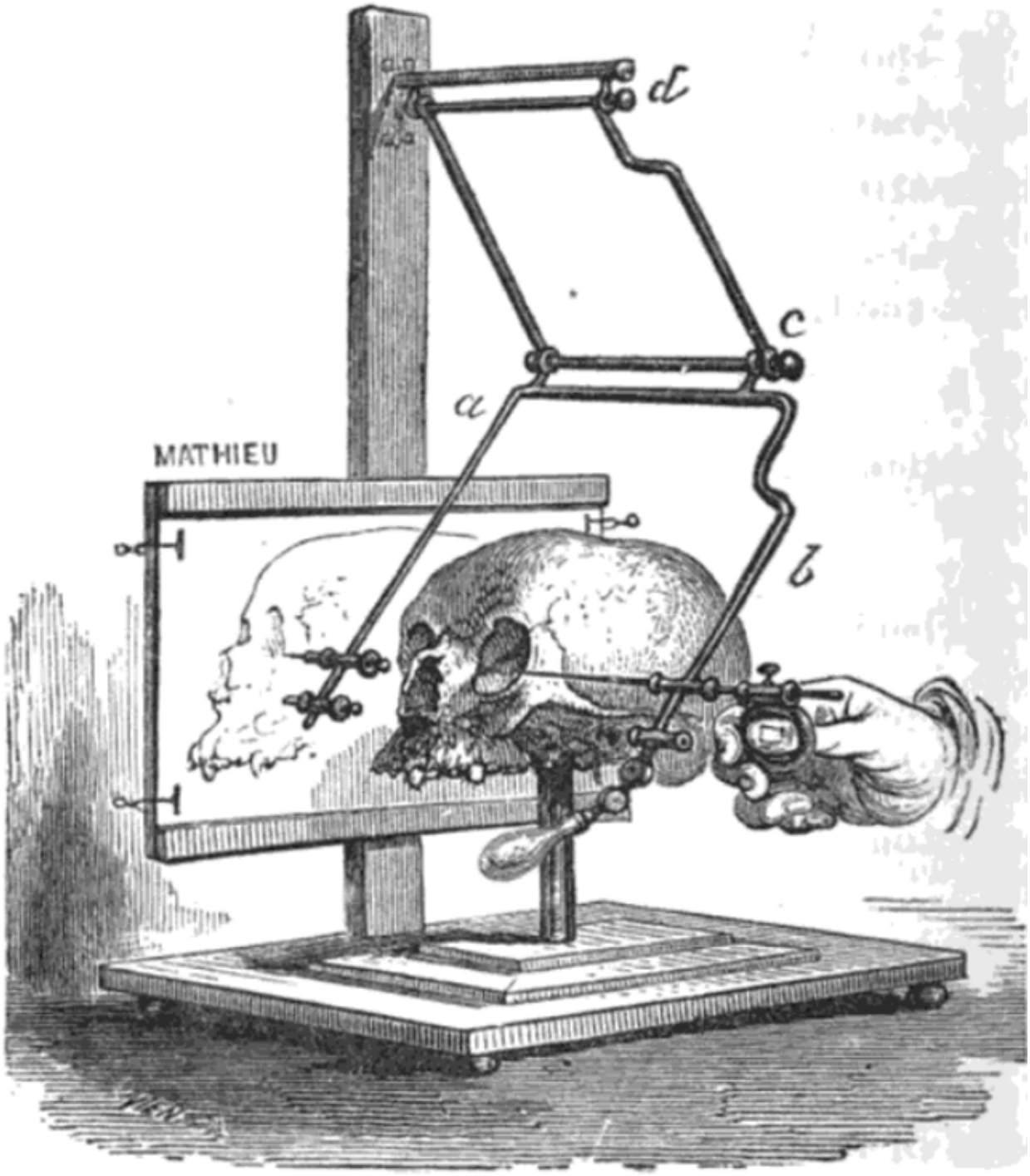
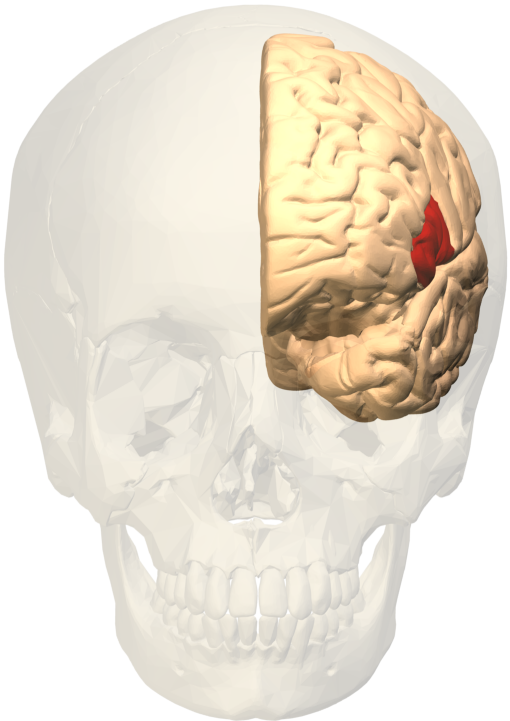


Fig. 3: Stereograph

Fig. 4: Broca's Area

Broca's Area - Lateral View



Broca's Area - Front View

Contemporary Assessments:

Pierre Paul Broca made many discoveries and large contributions in his area of work. He is most well known for his work on the human brain. His most significant contribution is known as "Broca's area". "Broca's area" is the area within the human brain that is located in the frontal lobe, responsible for the motion required to produce speech. A person that is able to understand what others are saying, but has trouble finding words and actually speaking, is most commonly known to have "Broca's aphasia". He was able to make these discoveries by observing patients who had left frontal lobe damage, which he saw to be lesioned. Broca's area has transformed the way we now understand speech production, language processing, and the way we comprehend things. Broca's area has been a big help to researchers, helping them find causes linked to other speech disorders that are common in our world today and that are connected to this area of the brain. These speech disorders include stuttering and apraxia of speech. Another large discovery of Broca's that has had a great impact on the world of science research today are the two famous institutions that he had founded, which are both located in Paris, France, and are formally known as the École des Hautes Études and the Société d'Anthropologie de Paris. The École des Hautes Études is now known to be one of France's most prestigious establishments for research and education, specifically known for teaching neuroscience and chemistry in the natural science area. The Société d'Anthropologie de Paris, founded in 1859 by Broca, was a society made up of various scientists that were the members, where theories and ideas were discussed and observed. Today it is one of the oldest and still operating professional anthropological societies in the world, where they focus on studying the natural history, origins, and biological diversity of the human species.

Broca may be most well known for his work on the frontal lobe of the human brain, but that is not all he is known for. His contributions toward anthropometry are quite notable as well. In this area of his work, he presented the idea that physical features of the human body played a large role in predicting intelligence. He had created many instruments and data points that are now the foundation of methods used in medical and archeological craniometry. Paul Broca was not only a great anthropologist, but an amazing neurosurgeon as well, who came up with many findings and theories that are referred to and used a lot in our world today. His work on the human brain has become very influential, and his efforts have opened the path way for many more great discoveries.

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CHAPTER 7

Early Americans

Author Britt Anderson

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      - *1.2.0.1.1 What form of philosophy is he most strongly associated with?*
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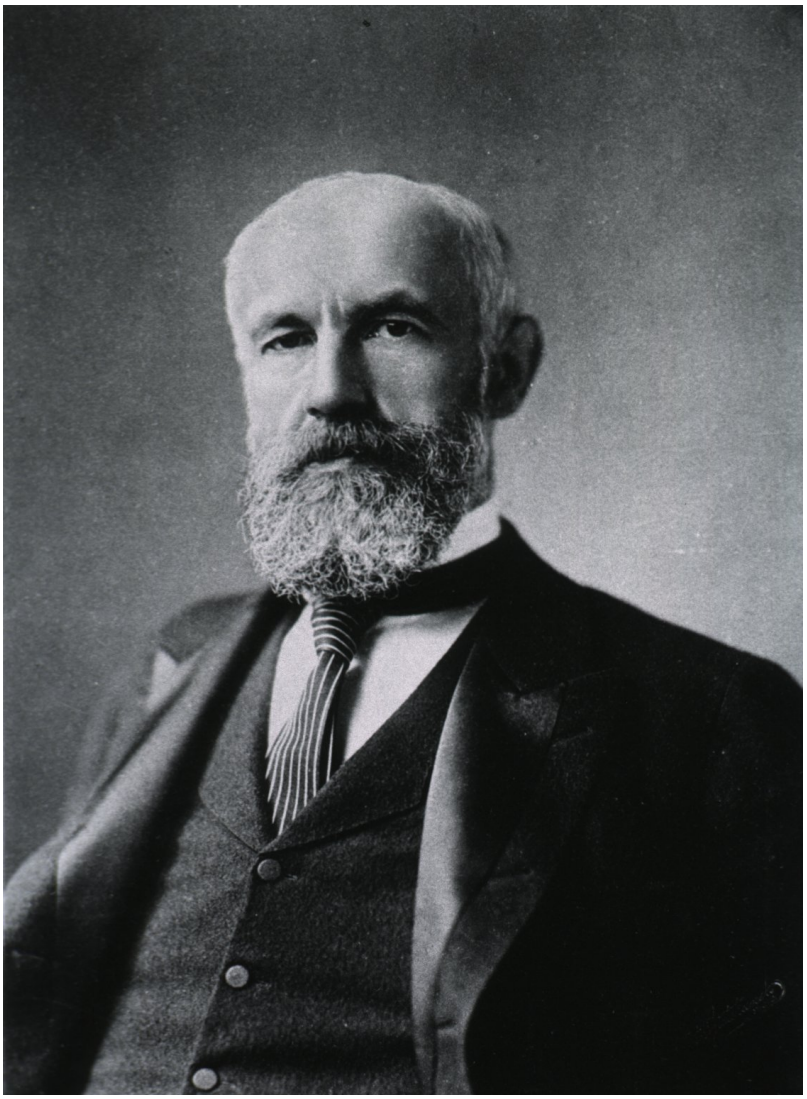
7.1 1 Stub

7.1.1 1.1 Granville Stanley Hall

Contents:

Granville Stanley Hall

by Saron Yakob, Kendra Sleeman, Catherine Bergs, and Bryanna Jackson



Granville Stanley Hall

Abstract

Granville Stanley Hall greatly influenced the relationship of American academia to psychological study. He launched two organizations that continue to promote empirical psychological study and scholarship to this day. Hall's understanding of life's stages, particularly adolescence and senescence has been critical to our current understanding of youth and old age.

Early Life and Education

Granville Stanley Hall was born on February 1, 1844, in Massachusetts. His father, Granville Bascom Hall, was a politician. His mother, Abigail Beals, went to school at Albany Female Seminary, then proceeded to become a teacher. Hall was raised in a religious household, and at first wanted to become a minister. When he graduated from Williams College in 1867, Hall completed his seminary training. But his time in the clergy was short-lived; after "ten weeks

as a church pastor [Hall] decided to leave the ministry". Hall then went on to teach "literature and philosophy" at Antioch College from 1872-1876. In 1878 he was given the first Ph.D in psychology in the United States. Hall studied physiological psychology in Germany. When Hall returned to the States he became very popular, being invited to give lectures at Harvard and Johns Hopkins University. After these series of lectures, Hall secured a faculty position lecturing on psychology at Johns Hopkins University in 1882. source

Key Discoveries

Granville Stanley Hall is perhaps one of the best-known psychologists in American history. Today, he is remembered for his influential contributions to the field including founding the first American psychology laboratory at the John Hopkins University, and representing a major transitional period in psychological thought. G. Stanley Hall earned a PhD in psychology, becoming the first American to do so. He became the first President of the American Psychological Association in 1892. source

In psychological thinking, Hall's research marked a transitional period from thinking of human psychology as fairly static to viewing it as based in developmental stages. His thoughts were marked by the impact of more contemporary thinking in the 20th century. His work was valuable to a number of eugenics-based organizations. Following his family's death in 1890, Hall was professionally prolific. He wrote widely and founded several newspapers and organization as well. In the following years G. Stanley Hall was appointed as the American Psychological Association's first president.

One of his greatest achievement was to early psychology development and growth. "By 1898, out of the 54 PhD degrees awarded in the United States, Hall had supervised 30. Lewis Terman, John Dewey and James McKeen Cattell are some of those individuals who studied under his impact" source He and his students produced over 190 questionnaires that were instrumental in fostering an increase in interest in child development research. Hall furthermore used these questionnaires at Harvard to write two important papers: one on children's lies (1891) and the other on children's minds (1893).

Hall founded the first journal in the fields of child psychology and educational psychology, the Pedagogical Seminary (later the Journal of Genetic Psychology). "He has written 489 works covering most of the major psychological areas, including Senescence, the Last Half of Life (1922) and Jesus, the Son, in the Light of Psychology (1917). A psychologist's life and confessions (1923) was his autobiography."

Professional Activities

Granville Stanley Hall's first published book particularly focused on German culture. Despite beginning his studies and works on English as well as philosophy, he later became a Professor at John Hopkins University, for psychology and pedagogy. The American Journal of Psychology also became one of his several achievements, launched in 1887.

Johns Hopkins University, Main Building

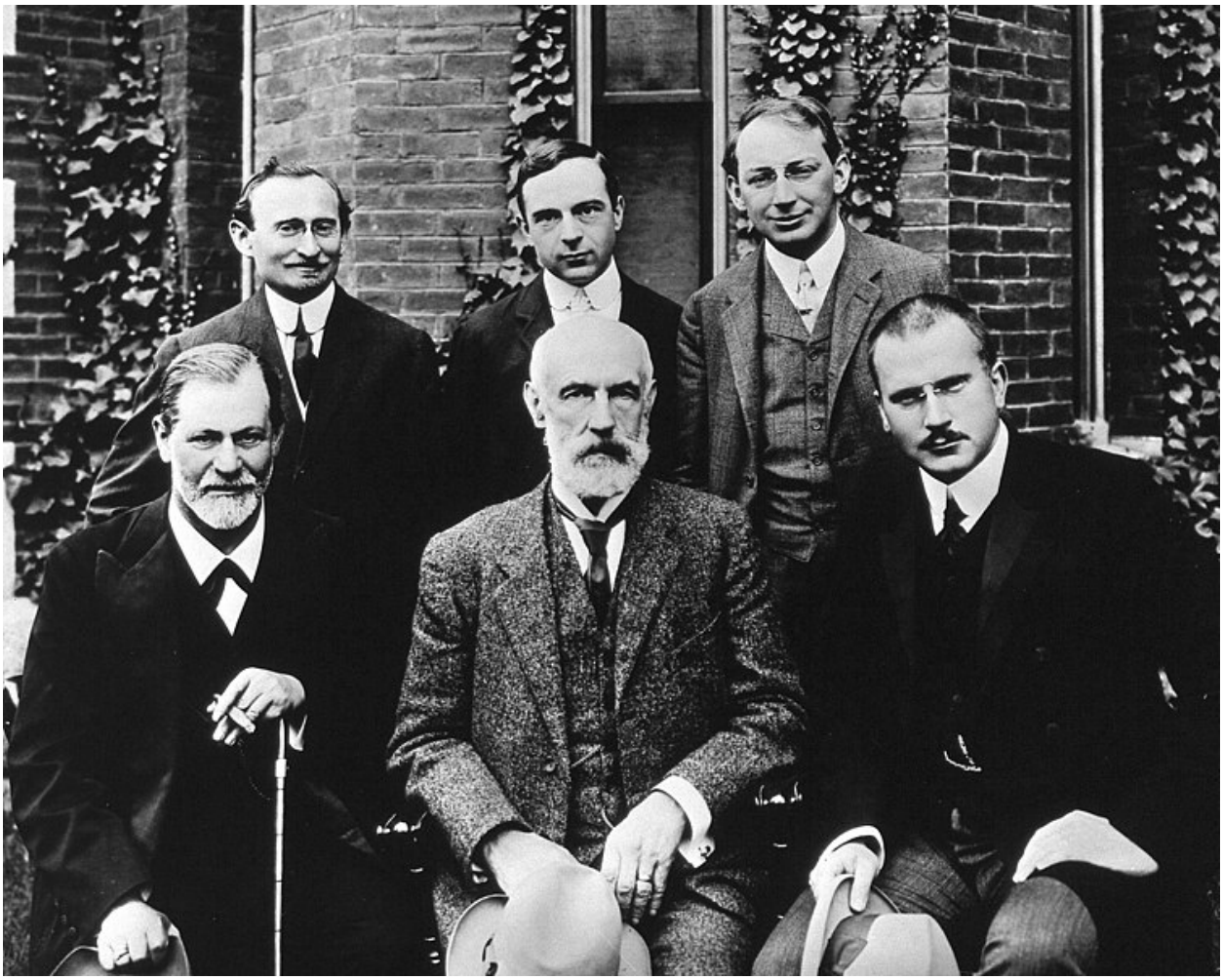
Adolescence, focuses explicitly on the theory of adolescence, as it is an important "level" of life. Hall refers to the adolescence period (ages 12 - 25) as "strum and drang", also known as, "storm and stress". It's about how easily our actions and emotions can contradict. The main aspect of this stage of life is on reaching a certain level of maturity but still developing after reaching this stage if life. source

His book called Senescence highlights the "last half of life". Senescence is when you reach the age of 60, and age older and older. It is the time of our life that leads to retirement and ultimately death source. The book and Hall's theory of senescence concludes that "death is the end of the body and also the soul, which overall gives us the image that death allows a new life of joy, as well as love source.

Contemporary Assessments

Much of G. Stanley Hall's work remains relevant to this day. Having inspired a cultural shift towards viewing adolescence as a separate life stage from childhood and adulthood, Hall is often called the "Father of Adolescence." He brought the German psychological idea of adolescence as a time of "storm and stress" to American psychology, differentiating the extreme emotions and behaviours of adolescence from the criminal activity or mental illness of adults, and laying the ground for the pop-culture stereotype of the moody "troubled teen." He also articulated difference between male and female social groups in adolescence, attributing physical aggression to males and relational aggression (i.e. rumour spreading) to females. This insight on teen social groups has been helpful to psychologists and comedians alike, laying the basis for such cultural classics as *Mean Girls*, Tina Fey's seminal work. Hall encouraged educators to view adolescence as an opportunity to intentionally shape individual and cultural development and contribute to advantageous human evolution. His approach to children and youth programming encouraged the launch of programming like the YMCA and YWCA that emphasize physical health, team building, and community building. His perspective is part of why we continue to encourage children and youth toward team sports and extracurriculars. Hall also identified old age as a separate life-stage. With an aging population in the 21st century, this identification and the study of this separate life-stage is increasingly significant, emphasizing the importance of providing seniors with positive social relationships, personal affirmation, and opportunities to contribute to society even as their physical abilities decline.

Hall's long term influence on psychology also spread beyond the concepts of life stages. His launch of the American Journal of Psychology, American Psychological Association, and America's first psychological laboratory essentially make him the father of American psychological academia. In fact, he directly oversaw the doctoral work of tens of the the USA's first doctoral psychology students. He also promoted the works of Sigmund Freud and Alfred Adler, providing them with necessary legitimacy that helped ensure their influence on psychological thought. Without Hall's influence, the current landscape scientific psychology would certainly look very different!



Sigmund Freud's 1909 Visit to Clark University

Unfortunately, not all of his work was so positively impactful . Hall's opinions about the differences between boys and girls lend legitimacy to harmful stereotypes. Modern psychologists criticize the "storm and stress" idea, noting that not *all* adolescents fit that mold. And worst of all, Hall was strongly in favour of eugenics (intentionally breeding "superior" humans - think Nazis and Aryanism, or the forced sterilization of "troubled" youths and criminals in some parts of the world in the early to mid 20th century).

An enjoyable video about G. Stanley Hall:

Like every historical figure, Granville Stanley Hall contains multitudes. Modern psychologists must approach his work critically, while maintaining respect for his memory.

Further Reading

The full text of *Adolescence: Its Psychology and its Relations to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education*

https://archive.org/details/adolescenceitsps01hall/page/n9

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(1909) *Sigmund Freud's 1909 Visit to Clark University.* Retrived from https://commons.wikimedia.org/wiki/File:Hall_Freud_Jung_in_front_of_Clark_1909.jpg

(1910) *Portrait of Granville Stanley Hall.* [Photograph]. Retrieved from https://upload.wikimedia.org/wikipedia/commons/b/b4/G._Stanley_Hall.jpg

In addition, you might be interested in this podcast on G. Stanley Hall and the Child Study Movement

7.1.2 1.2 William James

1.2.0.1 Ludwig Wittgenstein is one of the most famous philosophers of the 20th century.

1.2.0.1.1 What form of philosophy is he most strongly associated with?

1.2.0.1.1.1 Analytical philosophy

1.2.0.1.2 What is the only "psychology" book that he kept upon his shelves?

1.2.0.1.2.1 What Wittgenstein Learned from William James

1.2.0.1.3 Why was Wittgenstein interested in this picture?

- Read about Wittgenstein's interpretation by search here.

CHAPTER 8

Founding of a Scientific Psychology in Germany

Author Britt Anderson

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8.1 1 More than just Wundt

Any date for the founding of experimental psychology will be arbitrary. Selecting 1879 as the founding of the experimental psychology laboratory at Leipzig emphasizes the introduction of experimental tools, procedures, and an emphasis on testable theories to the growing tradition of empirical thinking in mental and moral philosophy. Similarly arbitrary is the anointing of one man as a founder of experimental psychology. By naming Wilhelm Wundt to this role we commemorate the founding of a laboratory psychology, but we also emphasize a man who is known more for bureaucratic success than scientific achievement. Many of the domains of psychology that are dear to modern minds are ones that Wundt closed off as beyond scientific approach. Memory assessments relying on words, poems, or pictures were too contaminated by learned associations to be effective, pure probes of conscious experience. A reliance on reaction time showed the usefulness of new measurement devices, but Wundt was not a keen experimentalist and was not innovative in new tools for measurement or for expanding the domain of psychological study. And as another consequence of his emphasis on a pure, near simultaneous, report of conscious experience the entire domain of thought and reasoning was beyond approach. For the same reason, experimental subjects should be trained in introspection, but not in the content about which they are introspecting, e.g. music. To study musical perception required, according to Wundt, introspectors who were musically naive. Wundt carried strong theoretical prejudices, which often determined his scientific positions more than empirical evidence. Convinced of the primacy of visual experience and images Wundt labeled any evidence at variance with this idea to be axiomatically the product of bad experimental technique.

It is clear then that by elevating Wundt to the role of founder of the field, we are giving priority to one aspect of our science: its development as an experimental discipline; but ignoring many other aspects of its early development as a science. Through the examples of some of Wundt's contemporaries we can see how early scientific psychology was enriched by additional approaches and different strengths. In this chapter four of these early German contemporaries are highlighted.

8.1.1 1.1 Hermann Ebbinghaus (1850-1909)[1]

Fig. 1: Hermann Ebbinghaus

Hermann Ebbinghaus can be regarded as a bit of a dreamer. He came to psychology through a meander in the book stalls of Paris, and his methodological insight through the poetry of Alice in Wonderland. He his however a critical and seminal figure. He was one of the first to begin to pry psychology from the conceptual straight-jacket in which Wundt had laced it. It is a common misconception to see Ebbinghaus as a one-hit wonder, but in addition to revolutionizing memory research (and indirectly encouraging psychologists to think more creatively about whether they could study

[1] Hermann Ebbinghaus photo credit.

mental phenomena more broadly) he was also a critical early worker in the field of intelligence, spread the necessaries of psychological research by founding three separate university laboratories, and broadened the dissemination of psychological knowledge (especially thinking outside Wundtian boundaries) through the founding of an important experimental psychology journal (that still exists to this day[2]).

1.1.1 Some Biography[3]

Hermann Ebbinghaus was born in Germany to a wealthy family. His father was a merchant, and Hermann was a good student going on to the Gymnasium (which is the type of secondary school intended for University bound students). He attended three universities: Bonn, Berlin, and Halle. It is regarded as a successful innovation of the German University system that their concept of *Wissenschaft* put up few barriers to transferring between institutions, and thus students were able to seek out and get the education that best suited them even when that varied over their university careers. The Franco-Prussian war lasted for about one year when Ebbinghaus was 20 and he was a soldier. By 23 he had obtained his PhD in philosophy with a thesis[4] on Hartmann's philosophy of the unconscious[5] . We can infer that Ebbinghaus was a bit indeterminate about what form his career was to take as he spent the next few years in France and England as a student and a teacher. He is 30 when he returns for his Habilitation in Berlin (essentially a second PhD thesis then required of all academicians in the German speaking system). This research is his *Gedachtnis*, which is published in 1885. Its importance results in his being appointed a professor. The book is important in two regards: one it provides important objective results on human memory. Perhaps more importantly, it provides an example of how a domain of human psychology formally thought to be impossible to rigorously investigate could in fact be pursued by investigative creativity. From Berlin to Breslau to Halle Ebbinghaus developed psychological laboratories at three different universities. He died, relatively young (59), of pneumonia.

1.1.2 Scientific Highlights

Ebbinghaus viewed Gustav Fechner as his inspiration, and dedicated his *Gedachtnis* to him (*"Ich hab' es nur von Euch."*). The story told in Ebbinghaus's obituary is that his familiarity with Fechner was due to a chance finding of Fechner's Psychophysics; the discovery the chance result of a stroll on along the second hand book stalls that then lined the Seine in Paris. Ebbinghaus's own take on the history of psychology (and the source of his famous line that a long past and a short history can be found in the introduction to his *Abriss der Psychologie*[6] .

One of the challenges that was thought to face memory work in an era when a scientific method for psychology was preoccupied with pure introspections of conscious experience was how to disentangle memory per se from all the contaminating associations that decorate every term and every image with which we are familiar. These are various and would work to make any conventional memory assessment hopelessly confounded by unique, and unknowable, individual experiences. Ebbinghaus however hit upon the idea of using nonsense, pronounceable syllables. These, presumably unique in the subject's experience, would be clean and would permit memory to be measured without contamination. Exactly how Ebbinghaus came up with this idea is uncertain, but much lore explains it by his exposure to English, where he would have been confronted with sound strings that were to him unfamiliar, but necessary to memorize. Perhaps to it was the poetry of Lewis Carroll's Jabberwocky[7] that inspired him with its meaningless neologisms[8] or even the occult expletives of London and Parisian coachmen and cabbies[3] .

A Short Video on the Memory Research Methods of Hermann Ebbinghaus

[2] The journals home page is: https://us.hogrefe.com/products/journals/zeitschrift-fuer-psychologie and an editorial with some history and some discussion of the name change can be found here: http://dx.doi.org/10.1027/0044-3409.215.1.1 .

[3] Much good biographical material can be found in Ebbinghaus's obituary in the American Journal of Psychology. https://dx.doi.org/10.2307/1414874

[4] The thesis is available on line as a free book.

[5] This book was only recently published: https://en.wikipedia.org/wiki/Philosophy_of_the_Unconscious. An English translation is available [[https://archive.org/stream/philosophyuncon04hartgoog#page/n3/mode/1up]. According to the foreword by the translator the book was published in 1868 by the then 27 year old philosopher.

[6] https://archive.org/stream/philosophyuncon04hartgoog#page/n3/mode/1up

[7] A portion of Lewis Carrol's Jabberwocky from Alice Through the Looking Glass. :: Twas brillig, and the slithy toves Did gyre and gimble in the wabe: All mimsy were the borogoves, And the mome raths outgrabe.

[8] Ebbinghaus may not have been the only early psychologist inspired by poetry as a method for studying memory. See also https://archive.org/stream/obliviscenceremi02ball#page/n14/mode/1up.

Using himself as the sole research subject Ebbinghaus established the core features of human memory. He noted the effects of primacy and recency. The exponential decay of the forgetting curve is in his work, as his the highly creative methodology that permitted him to measures savings scores. An English translation of his magnum opus can be found here. But in addition to its direct data, this work was important to the young science for its impact on other practitioners interested in other areas. It showed how one could approach these off-limit domains. To quote Titchener: "It is not too much to say that the recourse to nonsense syllables, as a means to the study of association, marks the most considerable advance, in this chapter of psychology, since the time of Aristotle."

While known for his memory work, a less appreciated contribution of Ebbinghaus was his development of an early intelligence test that was directly influential on other later intelligence psychologists.

8.1.2 1.2 Carl Stumpf (1848 - 1936)

1.2.1 A Short Video Introduction to His Career

1.2.2 Biographical and Career Highlights

Carl Stumpf[9] is evidence that all early scientiific psychology did not descend from Wundt. Stumpf himself did not train under Wundt, and in fact was engaged in bitter disputes with Wundt regarding the proper methods for psychological research on music. He was also important for the movement that came to eclipse Wundt's Voluntarism, Gestaltism. Two of Gestalt Psychology's founders, Koffka and Köhler, spent part of the careers with Stumpf.

Stump was born in Germany, before it was Germany[10] in Barvaria a region that contains Würzburg where he would work for a period, and where Külpe would also Chair. Stumpf's family was cultured and upper middle class. His father was a physician, and two uncles were scientists. The house was musical, and Stumpf had obvious talents that were apparent at an early age. He could play the violin at 7, and it is said that he composed his first oratorio, a piece for three male voices, when he was only ten. His mastering of the violin was followed up by learning to play several other musical instruments. Stumpf's psychological training took place in Würzburg under Brentano (known for his Act Psychology), and at Göttingen where, following Brentano's advice, he continued his psychological studies with Lötze. His disertation was on the philosophical side of psychology: The Relationship Between Plato's God and His Idea of Goodness, which reflected his supervisors' approach to psychology. There is some idea that he thought about becoming a priest, but during the debate over papal infallability he decided not to pursue clerical training, but rather psychology. In addition to his training he had other exposures to the discipline that may have contributed to this choice. His family knew both Fechner and Weber and the story is that Weber even measured two-point discrimination on Stumpf in the parlor of his brother's house. His work on space perception began in the early 1870s, before the official, post-hoc, founding of experimental psychology (and showing that this idea of a founding year is quite arbitrary).

Stumpf's controversy with Wundt had to do with the method of introspection and the proper subjects for this research. Recall that much of the work at this early stage was devoted to the conscious experience of physical, sensory stimuli. The participants, or subjects, of research at this time were expected to be expert in introspection so that they could give reproducible and reliable accounts of their conscious experience, e.g. by avoiding the stimulus error. Another pre-occupation was to avoid the reporting of learned associations; the report of the conscious apperception was to be primal and learned. Who then would make the best subjects for this research? Would it be those naive to music, its structure, its vocabulary, and learned associations? Or should it be those with muscial capacities who would possess an appreciation of the subtle characteristics of music and have the right terms to express their experiences, but whose reports might also be contaminated by the associations learned during the development of their skills? Take a moment

[9] For more detail there is an excellent article in the Stanford Encyclopedia on Stumpf.
[10] https://www.britannica.com/event/Franco-German-War

to think which of these two eminent psychologists would have come down on which side of this debate, and then read some of their nasty to and fro[11][12] .

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Mach and Stumpf sat down together before a harmonium,
in the physical laboratory at Prague, to decide the question
whether attention to one of the component tones of an
ordinary musical chord does or does not strengthen that
particular tone. Mach declared that the intensification
was quite clear; Stumpf could find no trace of intensive
change. ...
What is the value of a method which lands us in
difficulties of this sort?
-- E.B. Titchener  [12]_
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Stumpf's legacy is probably greater than Wundt's today with a renewed interest in his thoughts and writings. Perhaps this could have been forseen as William James is said to have fancied Stumpf of all the German psychologists he met during his European visits.

8.1.3 1.3 Georg Müller (1850 - 1934)

– To Do – Müller Biography

- Born in Grimma (near Leipzig). Father was a parson.
- Higher education in Berlin, Leipzig, Göttingen.
- Did his time in the Franco-Prussian War.
- Influence by Lötze in Göttingen and Fechner in Leipzig.
- Landed an instructor's position at Göttingen and spent the next 40 years there.
- In 1887, two years after Ebbinghaus's work on memory published, Göttingen group begins mopping up.
- The heir to Fechner in psychophysics. He dropped all the panpsychism and presented it as the first real effort to establish quantitative laws in the mental realm.

Müller's Three Keys to a Successful Academic Career

1. Be appointed a professor at a young age (31).
2. Marry an intelligent woman.
3. Have poor health and a temperament that precludes overconfidence.

from Portraits of Pioneers in Psychology by Gregory A. Kimble.

Müller Biography

Was a literary kid, reading Goethe, Byron. Note that he was another example of these students who attended university in multiple cities. Lötze is mentioned on page 49 of the Blue book. More in the mode of the philosopher-psychologist than the scientist-psychologist. Müller was a very proper prussian; he demanded order and precision. This was the reason that his first teaching position in the Austrian hinterlands was so unpalatable. It is easy to draw a connection to his success as a methodologist and this aspect of his temperament. Sent critiques of their ideas to both Lötze and Fechner, which they received well; a tribute to both them and the thinking of Müller. In fact, his critique of Fechner led to Fechner publishing a revision of his work.

Müller's Contributions

[11] Stumps' closing words to Wundt and Wundt's rejoinder (easy to get the last word in when you have your own journal, and a pretty clear reason why you need more than one scientific psychology journal - Thank you Ebbinghaus.)

[12] Page 436 of http://www.jstor.org/stable/1413427

- Technical refinement of Ebb's methods: e.g. drew consonants and vowels at random, presented stimuli with a memory drum.
- Through his use of introspection during memory tasks he discovered the phenomenon of "chunking"
- Studied interference effects, visual perception, colour theory.
- Co-discoverer of Jost's law.
- The methodological conscience of German Psychology.

Müller's Contributions Jost's Law: If two associations are of equal strenth, then repetition strengthens the older more than the younger.

```
Tribute to Müller "What assured the far-reaching results of his
scientific research was to a great extent his exemplary scientific
methodological stance. It is characterized by ... rigor and simplicity,
its cleanness and reliability and likewise limitation inn its
interpretation of the results obtained (Hische, 1935, p 146)" --- quoted
from Portraits of Pioneers in Psychology, by Gregory A. Kimble.
```

Müller Comments Insisted on being a subject in every new paradigm. Went to lectures in other faculties, including physical chemistry by Nernst.

8.2 2 Early Psychological Laboratories

- Cattell's report in Mind 1888 (pdf)
- Cattell's report in Science

8.2.1 2.1 Oswald Külpe

Contents:

Oswald Külpe

Authors: *Sanjam Khangura, Xi Wang, Herleen Devgan, Jeongim Park*

December 7, 2019

Purpose

- The Founder group project is assigned for ARTS 140 class.

Abstract

Oswald Külpe(1862-1915) was a German psychologist and philosopher, and the founder of the Würzburg school of psychology. Külpe actively worked across Leipzig and Würzburg, both in Germany, and educated many pupils. His significant contributions on such topics as logic, aesthetics, and philosophy, and his distinct views departed from those of his mentor Wundt's and are still relevant for psychological research today.

Fig. 2: Oswald Kulpe

Early Life and Education

Oswald Külpe was born in Latvia and started practicing in Germany with a career that hatched the origin of a new emphasis in early Psychology on abstract thinking. Külpe was the guiding force behind the experimental study of thought processes and his approach is identified with the Würzburg school of psychology. Külpe's early academic interests hopped between history and psychology. After completing a dissertation on feeling for Wundt at the University of Leipzig Külpe spent eight years at the Leipzig laboratory. Most of that time he acted as Wundt's assistant. Unlike Wundt, Külpe became an adherent of positivism. In 1888 Külpe became a lecturer at the university. He wrote 'Grundriss der Psychologie' in 1893, in which he defined psychology as a science concerned with experiences dependent on the experiencing individual and outlined the findings of experimental psychology. In 1894, Külpe was appointed professor at the University of Würzburg. Under his inspiration and direction, the institute published some 50 experimental studies before his departure for the University of Bonn in 1909. Best known is his research on the effects of attitudes and tasks on perception and the course of recall and thought. Slowly, Külpe began to form his own ideas about psychology. Influenced by Ebbinghaus' research on memory, he began to wonder if thinking itself might be accessible to introspective research. Once Külpe had been appointed full professor at Würzburg in 1894, he proceeded, with all the energy and tenacity at his command, to set up an institute for psychological experimentation. He was supported by Karl Marbe, who had become a docent at Würzburg in 1894. After two years, Kiilpe was granted the use of a few rooms by the library, and it was there that he and Marbe began to experiment, without assistants, staff, or funds. It was only after Külpe had declined appointments both to Minister and Stanford that he was able to secure government grants, and he then hired Ernst Dürr as his first assistant. His successor at Würzburg was Marbe, and Marbe's first assistant was Kurt Koffka.

Professional Activities

- In 1888 Külpe wrote his habilitation thesis on the doctrine of the will in recent psychology, Wundt published this article in his Philosophical Studies. This journal is edited by Wundt himself and it's the first journal devoted primarily to experimental psychology. Külpe was therefore qualified as a lecturer at Leipzig University. At the time, Wundt's first assistant, James M. Cattell, returned to the US, and Külpe became Wundt's second assistant, working on his own and others' experiments. During his eight years as a research assistant at Wundt's laboratory, Külpe compiled Principles of Physiological Psychology for his mentor.
- In 1893 he wrote and published the Grundriss der Psychologie (Outlines of Psychology) and dedicated it to his

teacher Wundt. The book defined psychology as an empirical science that relied on experience and therefore Külpe promoted to a professor at Leipzig University.The book soon became a classic textbook for the study of psychology, especially experimental psychology.

- In 1894 Külpe moved to the University of Würzburg as a professor of philosophy. He founded the Würzburg laboratory shortly after he worked at the University of Würzburg. Since then he and his students have established the Würzburg School, known as their famous imageless thoughts. During his 13 years at Würzburg more than fifty experimental investigations were published.
- Külpe's 15 years of teaching practice in Würzburg not only established his own school of psychology, but also cultivated many psychologists. His thoughts even have a great influence on the development of Gestalt psychology in the future. The founder of Gestalt psychology, Max Wertheimer, was his student.
- Külpe left Würzburg in 1909. After three years at the University of Bonn, Külpe moved to the University of Munich in 1912. Külpe became a professor of philosophy and director of the Institute of Psychology at the University of Munich after 1913.

Major works

- Grundriss der Psychologie (Outlines of Psychology), 1893.
- Einleitung in die Psychologie (1895; sixth edition, 1913; English translation, 1897)
- Philosophie der Gegenwart in Deutschland (1902; fifth edition, 1911)
- Immanuel Kant (1907; third edition, 1912)
- Psychologie und Medizin (1912)
- Die Realisierung (Realization) 3 volumes, 1912-23.

Key Accomplishments & Discoveries

As a structural psychologist, Oswalkd Külpe published various works on the topics of logic, aesthetics, philosophy, and epistemology. His first major book, Grundriss der Psychologie (1893) discussed his research on reaction time and psychophysics. He defined psychology as "the facts of experience". Külpe criticised points made by Carl Stumpf and Hermann Ebbinghaus. Because of Kulpe's distinctive views on reaction time and psychological thinking, Grundriss der Psychologie was translated into English under the title Outlines of Psychology. In 1912, Kulpe published On the Modern Psychology of Thinking, primarily focusing on the importance of thought. Due to his research, Kulpe was able to identify the need for new definitions for the systematic experimental introspection.

Contemporary Assessments on Their Work or Discoveries

- Oswald Külpe was the first to perform basic psychological research on thinking and problem solving. These ideas inspired later psychologists, such as Karl Duncker and Max Wertheimer, who were Gestalt psychologists (Markov, 2017). The idea of introspection further inspired Sigmund Fraud's psychoanalysis (Fossa, 2018).
- One of the accomplishments of Wurzburg School was an emphasis on motivation and the role that it plays in the results of the thinking process. Motivation is still relevant for psychology today. According to the Wurzburg School, motivation affects thinking outcomes as one of the variables, and the activity of the 'id' relies upon not only the subject's consciousness but also the unconscious determinants (Oswald Külpe, n.d.).
- Külpe's shift in the late 1890s from Mach's phenomenalism to realism stimulated his interests in the psychology of thinking. However, it might have been seen as a deviant move against positivism, which dominated the field of psychology and science during that period (Lindenfeld, D., 1978).

- Despite the early success of introspection which was one of the accomplishments made by the Wurzburg School, the idea was criticized and the Wurzburg School disappeared soon after its main contributors had died or separated. Some scholars later reevaluated introspection and found that the way the Wurzburgers conducted introspection was in fact more of an extended type of third-person observation, not a genuine form of first-person research. Moreover, their approach did not yield a balanced method for the emergence of third-person observation. Introspection as an independent paradigm was thus discouraged due to its methodological, biographical, and historical aspects (Hackert & Weger, 2018).
- The concept of reality and introspection proposed by Oswald Külpe impacted on the development of contemporary psychology. Introspection, which aimed at analyzing the internal processes of mental structures and cognitive functioning, led to the development of constructivist psychology and their applications to the education. In this application, we can assume that human beings actively interact with external information and reorganize their own mental structures (Fossa, 2018).
- From 2011 the Oswald-Külpe-Prize is awarded by the University of Wurzburg to commemorate a person who accomplished exceptional scientific contributions to the experimental study of higher mental processes (2011).

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Further Readings

Encyclopedia.com
Genvive
Springer Link
Researchgate

The methodology of early psychology was restricted to a few basic procedures. Reaction time and psychophysical methods were standard, but the main probe for a science of consciousness and the mental was introspection. It was the subjective, personal, data that was to be explained, and there seemed little way to probe this experience without a participant's direct report. Early scientific psychologists were not ignorant of the problems this posed for research to be scientific, that is repeatable and consistent. For Wundt introspection was very constricted. There was to be an immediate report of the content of consciousness, not an interpretation, but the raw content. Such a practice constrained the reach of scientific psychology. Thinking and reasoning for example would not be amenable to such a narrow admission of introspective data.

2.1.1 Is there only one kind of introspection?

Different terms were used by the early German scientific psychologists for introspection: *Selbstbeobachtung* and *innere Wahrnemung*. In the former there is a sense of observation, and in the latter perception. For Wundt, all mental events were compounds, and it was through a careful observation that science could be done by observing the individual components of experience. For Oswald Külpe introspection had broader application, and inner perception could be employed to gain insight into psychological processes and operations.

Fig. 3: Oswald Külpe: Science was his bride.

2.1.2 Biography

Külpe was born in the Baltic area to a German family. His father was a notary (like a lawyer) and he attended the gymnasium. He had two unmarried cousins who lived in Leipzig and who were major influences on young Oswald. As Külpe never married the motto associated with him was that "Science was his bride." He started out teaching history and went to Leipzig to study history in 1881 only two years after the formal founding of Wundt's laboratory. Külpe took some courses from Wundt and benefited from the *Wissenschaft* character of German Universities by transferring to Berlin for additional study. Subsequently, he went to Göttingen and there he met Georg Elias Müller who expanded the instrumentation and technical rigor of psychological research, and who followed up many of the seminal memory studies of Ebbinghaus. Külpe went to Russia to earn a teaching certificate, but rather than work in education he returned to Leipzig and earned a PhD (Theory of Sensual Feeling[13]) and Habilitation with Wundt.

[13] Link to the thesis [German] https://books.google.ca/books?id=G7I-AAAAYAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Külpe continued to work with Wundt becoming his laboratory assistant, then a privat dozent[14] . In 1894 he became an extraordinary professor, which is actually less impressive than being an ordinary professor. *Called* to Würzburg in 1896 he founded the psychology laboratory there and remained for fifteen years before moving to Bonn where he founded another new psychology laboratory. Four years later he moved to Münich, again to found a new psychology laboratory. WWI and the world's response to Germany deeply affected him (as it did many other German psychologists) who felt patriotic and that Germany had been misunderstood. He contracted influenza in 1915 and as a possible complication developed a purulent infection of the heart muscle from which he died[15] .

2.1.3 The Würzburg School

Külpe's enduring reputation comes from his association with the Würzburg school. The laboratory there represented a counterweight to Wundt's narrow interpretation of the permissible use of introspection in psychological research, and also represented a significant challenge to Wundt's scientific theory of the mental. For Wundt consciousness was an amalgam of sensation, feeling, and image. The group at Würzburg challenged this idea, putting particular pressure on the necessity of the image. In a series of experiments highlighting what today we could call *mental set* they demonstrated that task instructions could affect perceptual and conscious experience without any concomitant imagery. Conscious experience was characterized, by Wundt and similar thinkers, as having only duration, intensity, quality, and extensity (a spatial character). *Thought content* did not have these characteristics and was a suspect conscious element. Further, Wundtians felt that the introspective procedures of Külpe and collaborators was describing what had happened instead of the happening itself. A relatively contemporary discussion of this controversy of "imageless thought" can be found in Ogden, 1911 (pdf), and a later discussion by Boring (pdf). A more modern and full discussion of the school from Würzburg (Hoffman) is available.

2.1.4 Contributions

Külpe's contributions are several. He was interested in, and made more respectable, the scientific investigation of "higher" order processes including the use of introspection to probe such entities as thinking - though he was perhaps not as involved in this as posterity emphasizes. He founded and equipped three labs in Germany, was widely regarded as one of the "nice guys" of the profession, and if he had not died relatively young, might have had a much larger influence on the course of the field. Given his character and his interests he could be regarded as a forerunner of a Cognitive Psychology, and he certainly was a direct influence on the psychologists who would go on to do seminal work in Gestalt psychology (Koffka and Werthemier) and Intelligence (Spearman).

[14] https://en.wikipedia.org/wiki/Privatdozent

[15] Additional biographical and other material can be found in this article from the American Journal of Psychology, 1951.

CHAPTER 9

Early Psychologists from Other Lands

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Early Theoretical Schools of Scientific Psychology

Author Britt Anderson

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John B. Watson

Authors: Maddie Cannon, Arindam Sharma, Nakaya Dennis, Asmitha Ajaikumar

Date: December 8, 2019

Fig. 1: John Watson

Summary

John B. Watson (born January 9th, 1878 - died September 25th, 1958 at the age of 80) is an American psychologist who classified and broadcasted the study of behaviourism, a psychological approach which emphasizes scientific and objective methods of investigation. He is also commonly known as the father of behaviorism. Watson's theory of behaviourism has had a long lasting impact on the nature vs. nurture debate, more exclusively the strong role early experiences play in shaping personality. Once he received his Ph.D in psychology from the University of Chicago, he became a professor of psychology at the Johns Hopkins University and later established a laboratory for research in animal psychology. He is remembered for his research on the conditioning process, involving the "Little Albert" experiment in which he revealed that emotional reactions could be conditioned in people.

Early Like and Education

Dr. John Broadus Watson, born on January 9th, 1878, raised in Travelers Rest, South Carolina, where his parents, Pickens Butler and Emma Kesaih (nee Roe) Watson owned a farm. John's mother was a very religious woman who was against drinking, smoking, and dancing. While John was growing up, his mother forced these harsh religious beliefs that pushed him all the way into becoming an atheist. John's father on the other hand was a heavy alcoholic. He had left John and his mother when John was only 13 years old. This was something that made John resent his father entirely. In order for the Watson's to crawl out of the depths of poverty, John's mother decided that she was going to sell the farm and move to Greenville, South Carolina where John could actually succeed and make a decent living.

Greenville gave the Watson family so much more than the isolated farm did. There, they were introduced to all different types of people, which in turn, John used these different types of people to cultivate his theories on psychology. John understood the fact that in order for him to further his studies in psychology he needed to go to university. Furman University in Greenville, South Carolina was the one that he chose despite this poor academic performance and him being arrested twice during his time in high school, He used his mother's connection to get him into the university. John considered himself as a quiet, lazy, and disobedient student. He tried some psychology courses at Furman's but failed miserably at them. His transition from the countryside to the city left him with weak social skills. Once he entered college at 16, he excelled in classes other's simply failed at. Watson held a few jobs on campus that helped him pay for his tuition at the university. In retrospect, John still saw himself as "antisocial" and "awkward" which left him with not many friends. After graduating at Furman University, he went on to spend a year at "Batesburg Institute", a name he gave to a one-room school in Greenville. At "Batesburg Institute", John was not only the principal, but the janitor, and the labourer for the school.

After petitioning the President of the University of Chicago, he was enrolled into the university. His petition to the President was a key successor in him inserting himself into the world of psychology. He began studying philosophy under many professors like John Dewey, Jacques Loeb, Henry Herbert Donaldson, and James Rowland Angell. The four of them shaped Watson into developing a highly descriptive analysis of behaviour that Watson would later call "behaviorism" or also known as behavioural psychology. During his college experience, Watson met many professors and colleagues that would help into becoming a well known psychologist. Watson's peers played an important part in the role of his success in developing psychology into an actual field of study and his understanding of behaviorism. Watson explained behaviorism as a methodology could transform psychology into a science. All John Watson wanted to do was make psychology more scientifically acceptable, and that he did.

Professional Activities

After graduating with a master's degree at the age of 21, Watson spent a year teaching grade school. He then entered the University of Chicago to study philosophy with John Dewey however, he soon decided to go into a different academic field. He then considered researching on the physiology of a dog's brain with a racial biologist but later choose the field of psychology. In 1903 Watson presented his dissertation at the University of Chicago and then remained there as a research professor who focused on learning about sensory inputs in animals. Watson for his doctoral dissertation studied brain myelination and learning in rats with a resulting paper called "Animal Education: An Experimental study on the Psychical Development of the White rat, correlated with the growth of its "nervous system", through which he showed that there was a relation between myelination and learning.

Following his graduation with a doctorate, Watson decided to stay at the University of Chicago and one of the major works he did was a set of ethological studies of sea birds. It was done in dry tortuous islands in Florida where he studied many aspects of the birds' behaviour. For four years, these extensive studies were carried out and they were some of the earliest examples of what would later become known as "ethology". One of the first examples of the ethogram which was an in-dept record of the naturally occurring behaviour of an organism was the study of bird's behaviour. Due to his reputation as a top researcher in animal behaviour, he got a position at John Hopkins University. Where he was appointed as the chair of the psychology department but was later asked to leave.

After leaving his teaching profession, Watson got into the field of advertising, he started working for an American advertising agency of J. Walter Thompson. He began learning about the many aspects of the advertising business from the basics and even worked as a shoe salesman in a department store. In spite of entering a new field of work, he rose into an executive position of vice-presidency in a span of only two years. Where he also initiated many successful advertising campaigns which included Ponds cold cream and Maxwell House coffee ads. Watson also served as the president of the American Psychological Association(APA) and received a gold medal for his contributions. Watson's most influential and outstanding work was his study of emotions. His other important works include the book "Conditioned Emotional Reactions" which was done with Rosalie Rayner in 1920 and the "Psychological care of Infant and child" that was published in 1928.

Key Accomplishments and Discoveries

In 1915, Watson was the president of the American Psychological Association (APA), the youngest at the time. Around 42 years later, he was awarded by them for the work he had done in psychology. Watson carried out multiple researches and experiments throughout his life's span. He is specifically known for conducting the "The Little Albert Experiment",

which was done on an infant, to test reactions to stimulus and other classical conditioning. He was also known for the "Kerplunk" experiment, in which he had done on rats, to test voluntary (controlled) responses. The following video provides a brief overview of this work.

Watson was given the name father of behaviourism because of an article that he had published in 1913 by the name of "Psychology as the Behaviorist Views It" or the "Behaviorist Manifesto." In this article, Watson talks about the controlling of behavior and also objective experimental branch of natural sciences. In the article Watson confessed about the biases in regards to the questions. There was also a lot of criticism following the article about Watson lack of

Fig. 2: little Albert

evidence to support his claim. Watson also did some work on language, he then came to the conclusion that language was a manipulative habit. He also talks about trial and error and its relation to learning.

As mentioned above "Psychological care of Infant and child" was also one of the greatest work from Watson. This book gave Watson the attention that he had needed to be introduced into understanding children. It focused on sexual education and also the care of infants. It talked about where sexual education should begin and Watson stated that it was with parents. Furthermore, within the book he talked about unlearned behaviors

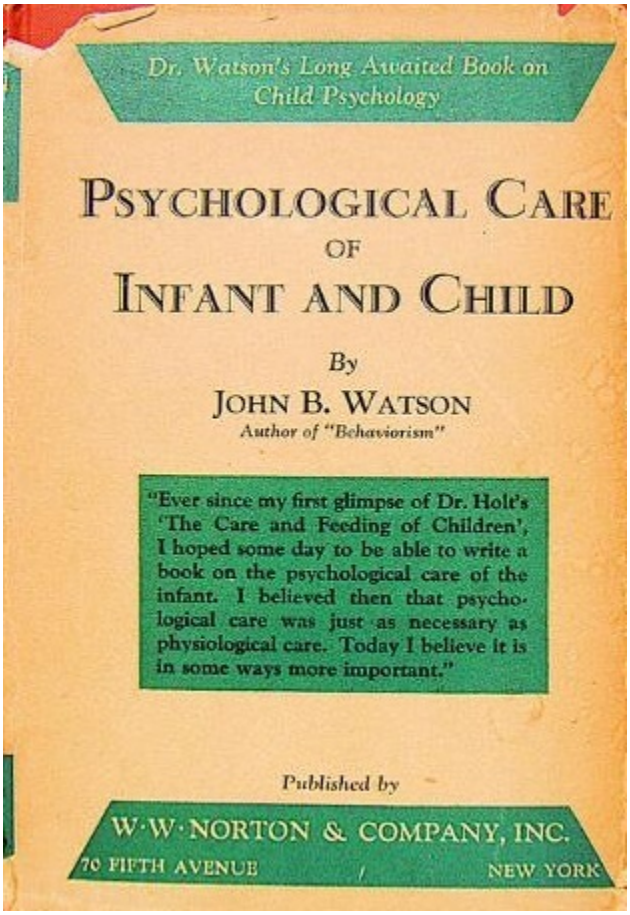
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Fig. 3: Psychological care of Infant and child

Contemporary Assessments

Nowadays, John Watson's experiment like "Little Albert" would not be allowed since it caused a great ethical concern. John Watson used the 9-month old infant as an experimental subject to see whether he could condition the baby to fear furry animals. However, there was no follow up or deconditioning. There is no evidence Watson cared much abou how the phobias he conditioned might affect little Albert's life.

Also, the infant's health at the start of the experiment is unknown. Medical records verify that Merriette had congenital hydrocephalus, and "recounted in disturbing detail treatments the child was subjected to during his first year of life, including repeated cranial and lumbar punctures to reduce fluid buildup in the brain" (Deangelis, 2012, para. 7). This supported the evidence that Little Albert was Douglas Merritte and suggests that Watson was aware of the medical conditions "Little Albert" was experiencing.

Lastly, over the years Watson's personal character has been called into question through the moral (or lack of) in his experiments. This is due to the fact that he had had an affair with one of his students, later divorced his wife and

was then fired from working at the John Hopkins University. There were also rumors (Aalai, 2015, para. 8) going around that he was fired for conducting sex related experiments. All of the bad publicity gave him a poor reputation as a person. What's more, there is documentation that suggests that Watson obstructed information to strengthen the study's findings, possibly "reasoning that an unresponsive child would provide a better baseline for later strong reactions and help deflect accusations of child maltreatment" (DeAngelis, 2012, para. 2). When teachers introduce John Watson today, he is often taught as a tale of warning to students that "men of science" could do anything that they wanted without taking responsibility or applying conventional standards of ethics. Not only does this confront the basic uses of experimental ethics, but it urges us to challenge the work due to the possibility of medical misogyny, the likelihood of scientific fraud and protection of disabled.

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CHAPTER 12

Neobehaviorism

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CHAPTER 13

Gestalt Psychology

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13.1 Wolfgang Köhler

13.1.1 *By: Omar El Refai, Najmah Ibrahim, Katherine MacDonald, Iris Xing, Joe Patterson*

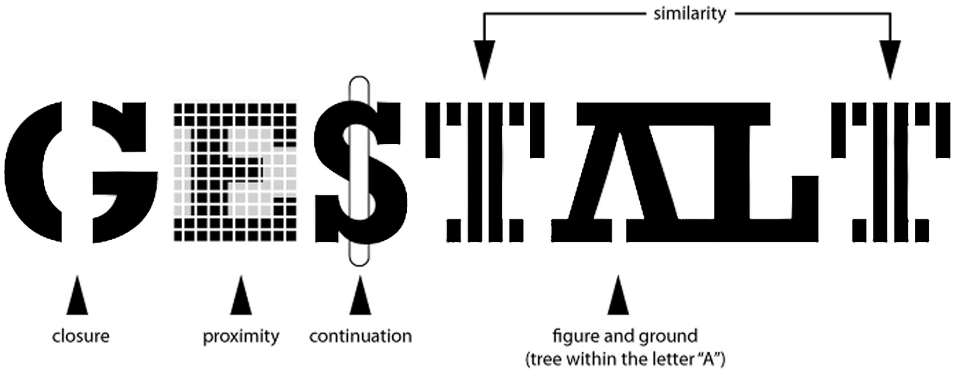
13.2 Education & Achievements

Köhler began his studies at the University of Tübingen in 1905, before heading to the University of Bonn in 1906, and completing his last few years of study in the University of Berlin. During his last few years of education, his work was largely on the connections between physics and psychology, which he explored with Max Planck and Carl Stumpf. His Ph. D Thesis was on Acoustic Investigations and addressed certain aspects of psychoacoustics (the study of sound perception) with Stumpf as his advisor. After completing his Ph. D, Köhler worked with Max Wertheimer and Kurt Koffka for 3 years (between 1910-13) and aided Wertheimer in his studies of apparent movement, which is now referred to as the phi phenomenon (the illusion of moving stills).

Following this, they created the Gestalt Theory, inspired by the earlier work of Stumpf and a lecturer by the name of Christian von Ehrenfels. They later wrote a book called The Task of Gestalt Psychology. In this book, they explored developments of Gestalt psychology. In the introduction, Köhler‘s displeasure of how his famous quote is misinterpreted as “the whole is greater than the sum of its parts” rather then how it was originally spoken as “The whole is different from the sum of its parts”, in which the sum may result in something completely unrelated to the parts, rather than a simple escalation.

In 1913, Köhler left Frankfurt for the island of Tenerife, where he began working on a book about problem solving and monkeys. The Mentality of Apes would be published in 1917, cataloging his research on how apes went about solving problems. His work was the start of insight learning as well as using chimpanzees for experiments due to the similarities between them and humans. In his book, he explained why he chose apes as his test subjects over cats or rats, which were the two other animals that were currently being tested on, due to the structure of their brains being similar to human brains. During this experiment, he gathered most of his observations during the first six months while

Fig. 1: University of Berlin



working with his assistant. He concluded from the experiments that there was a correlation between intelligence and brain development.

Köhler was very vocal in the psychological community and took stances against both introspection and behaviorism. Against introspection (the self-reporting of conscious thoughts and sensations), he claimed that it was far too subjective, and did not attempt to properly verify the conclusions that come from introspection. Against behaviorism (at the time focused only on what is easily observable and measurable), he argued that ignoring things like inner thoughts and feelings was insufficient, and that one could not accurately measure direct experiences.

In 1920, Köhler returned to Germany and was appointed as the professor and director of the Psychological Institute at the University of Berlin where he remained until 1935, after which he left to America as he refused to abide by the rules that the Nazi party imposed on him. During his time in Germany, he set up a graduate program in psychology, created a psychology journal, re-wrote Gestalt Psychology for an American audience, and helped von Restorff on her work on both the isolation effect (within many sensations, the odd one out is what you are likely to remember) and the theory of recall (memory).

He served as a professor for twenty years at Swarthmore College, before heading to Dartmouth College in 1956, where he was a research professor as well as the president of the American Psychological Association. During this time, he lectured freely around the United States, and made yearly visits to the Free University of Berlin, where he helped psychologists by keeping them in touch with American psychology and collaborating in research and encouraging discussion. He died in 1967 in Enfield, New Hampshire. The Association had planned to give him its gold medal, but he unfortunately passed away before he could receive that honor. The Leipzig Zoo established the Wolfgang Köhler Primate Research Center in his name.

13.3 Abstract

13.3.1 Early Life

Wolfgang Köhler was a German psychologist who would become one of the leaders in the development of Gestalt psychology. He was born into a German family on the 21st of January 1887 in Reval Estonia. His parents moved the family to Germany where his father was a schoolmaster when he was six years old. Kohler was married twice and had four children and died in New Hampshire on the 11th June 1967. He taught at the university of Frankfurt and amongst many of his accomplishments was his work published on the mentality of apes in 1917.

In 1909 Köhler earned his PhD and worked at the psychological institute of Frankfurt-am-Main where he came to know Max Wertheimer and Kurt Koffka, with whom he formed a life-long friendship and a fateful intellectual companionship. Together the three of them were able to set up the foundation for Gestalt psychology. The word Gestalt means the “unified or meaningful whole”.

Another contribution Köhler is famous for is insight learning. Wolfgang believed that learning could occur when we gain insight to an entire situation rather than focusing primarily on the individual parts, which can be interpreted as stepping back and looking at the bigger picture.

Before Wolfgang came along Edward Thorndike controlled the dominant views on learning. Thorndike believed that animals learned by a means of rewards and punishments. Kohler sought out to test his theory through experimentations with chimps. His studies suggested that through insight learning animals were able to grasp key learning concepts. Kohler had several of his own ideas at the time. He was able to extend the gestalt ideas into new experimental areas in memory and perception.

13.4 Gestalt Psychology and Fight Against the Nazis

Wolfgang Köhler contributed greatly to not only developing Gestalt psychology, but also through his social work against Nazis in Germany throughout his life.

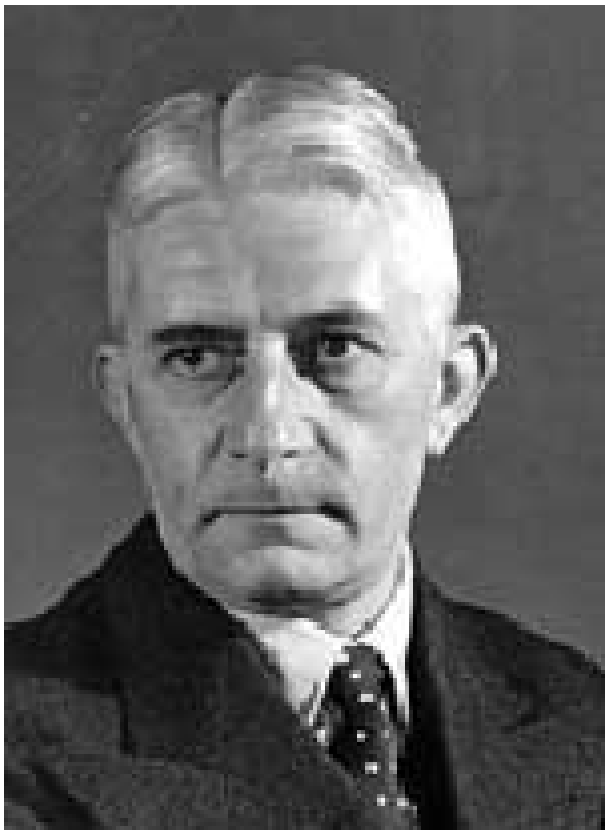


Fig. 2: Wolfgang Köhler

While you may know the phrase "*the whole is greater than the sum of its parts*", it had actually been mistranslated. The actual quote by Kurt Koffka was that "*the whole is **other* than the sum of its parts*" and was used to describe the field of Gestalt psychology (Dewey, n.d.). Wolfgang Köhler, along with Max Wertheimer and Kurt Koffka were critical towards the foundation of Gestalt psychology as well as the research that followed. Work towards Gestalt psychology first began in the early 20th century when Wertheimer completed experiments regarding apparent motion and perception. He found that when he placed the apparent movement of an object and the real movement of the object beside it, subjects were unable to distinguish the difference between the two.

Fig. 3: Phi Phenomenon

This intrigued Wertheimer greatly and inspired him to continue his investigations on the topic and to start the beginning of Gestalt psychology. In German, the word "gestalt" can be translated to "form" or "shape". It is based on the premise that while our sensory experiences can be broken down into individual parts, it is the relationship of these parts as a whole that we actually perceive (Boeree, n.d.). A common example is given in terms of music. Consider the video below. While a song may be made up of individual notes, it is their combination that we perceive as the melody. When Twinkle-Twinkle Little Star is played in different keys the notes that make up the melody change, but we still continue to recognize the same whole (melody) despite a complete difference in its parts (actual tones).

This largely differed from the principles regarding structuralism, a popular subject at the time, which believed that the conscious experience could be broken down into basic conscious elements. The work towards Gestalt psychology was largely founded on Carl Stumpf and Clerk Maxwell's work in physics. Köhler found that many phenomenon in physics supported the ideas of gestalt psychology and seemed to "justify" their work (Köhler, 1959). Additionally, further investigations by Koffka, Wertheimer and Köhler allowed them to develop the theoretical framework behind Gestalt psychology known as the Principles of Grouping. Examples of the Gestalt Principles can be seen in the following link.

The podcast *Gestalt Psychology* by Todd Daniel provides greater detail about the principles and also theory regarding how Gestalt Psychology came to be (around 00:08:35).

After lecturing at various American universities during the mid 1920s, Köhler was inspired to write the novel "Gestalt Psychology" (Henle, 2000). This novel was critical towards giving English speakers more information regarding Gestalt Psychology, but also provided criticisms to topics in psychology that are still relevant today (Henle, 2000).

Köhler also contributed greatly to protesting against the Nazi authorities during his time at the Psychological Institute of the University of Berlin. When Karl Planck and various other Jew professors were dismissed from their jobs at Universities in Germany, Köhler wrote an article titled "Conversations in Germany" against the Nazis. Although Köhler expected to be arrested, the Nazis didn't come, but letters from various strangers applauding Köhler's courageous stand did. One letter from a German Jew proclaimed that "[they were] deeply motivated by [the article] and tears came to [their] eyes." (Henle, 1978). Furthermore, when the government decreed that professors must open their lectures with the Nazi salute, Köhler gave a mocking salute and stated that he "[did] not share the ideology which it usually signifies or used to signify." (Henle, 1979). In addition to this, Wolfgang Köhler protested several times against unannounced raids during his seminars and requested for the reinstatement of his assistant. When his requests failed, Köhler resigned from the Berlin Institute and moved to the US for a new job at Swarthmore College.

Wolfgang Köhler played a significant role in the foundation of Gestalt psychology which is still used as the basis for research in sense and perception today. Furthermore, he fought against anti-semitism and proved to be an inspirational figure for both Jews and Non-Jews during that time of conflict.

13.5 Famous Experiments

Kohler's most famous experiment was one in which he studied insight learning in Apes. He completed these experiments during his time on the Island of Tenerife on the Canary Islands during World War One. This experiment took place within a large room containing bamboo poles and crates. He began by hanging a banana from a string to the ceiling and leaving the apes to figure out how to get it down. He noticed that the apes would jump and attempt to grab

it and once they figured out they couldn't get it that way, they would sit down for a while and ponder. After a while they would suddenly get up and attempt to grab it in a new way, by either using the crates or the bamboo pole. Some stacked boxes, and had to figure out how to stack them properly before jumping to grab it while others would use the bamboo pole to knock the banana down by throwing the pole at it (Kohler's Work on Insight Learning, n.d.).

The second half of the experiment involved putting the apes within a cage, giving them a branch of a tree, and placing the banana outside of the cage. This involved a similar reaction of attempting to reach them, discovering it was too far, going to think, and then suddenly snapping the branch in such a way that it could reach between the bars and extend their arms to reach the banana. Due to the similar reactions between Apes, Kohler concluded that they did not experience trial-and-error, but experienced a flash of insight and would go off of whatever they figured out until they achieved their goal (Ash, I. K., Jee, B. D., & Wiley, J., 2012). For Kohler's translated notes on this experiment click here.

Through these experiments he also discovered that the apes had these flashes of insight at different times and it took some longer than others to figure out a solution or even realise there was anything to do in their environment. For example, one of the apes named Sultan figured it out in the first and second experimental conditions almost immediately and was very successful, but another ape named Koko took several weeks to figure out a solution to the first experimental condition (Insight Learning (Wolfgang Kohler in 1925), 2011, December 6). Prior to his work what we knew about animal learning largely came from Edward Thorndike and his puzzle box experiments, which largely believed animals came to specific conclusions by accident and repeated random actions. Kohler's ape experiments showed that they can also experience flashes of insight that lead them to a specific goal when attempting to figure out a problem.

A fun video about Kohler's work:

His second most famous experiment included the use of hens and pieces of paper in shades of grey. He began by placing a lighter and darker piece of paper down and placing the feed on the darker piece, he continued this until they began always going to the darker piece before taking out the lighter paper and adding an ever darker paper (Encyclopedia.com, n.d.). He found that the hens wouldn't go to the same circle for the feed, but most went to the even darker one showing that they only remembered that feed always went on the darker circle. He repeated this experiment with chickens and a lighter paper, and again with apes and lighter paper and found very similar results. This proved to Kohler that both apes and chickens learned through association to a relationship and they didn't learn the specific colour.

From these experiments, Kohler was able to deduce that these animals learned an association to a relationship rather than just memorising the specific colour, which went against what behaviourists believed at the time, and became known as the Gestalt Law of Transposition (Smith, n.d.).

13.6 Criticisms, Influence, and Importance Today of Wolfgang Kohler and Gestalt Psychology

Many believe Gestalt Psychology to have died in the 1940's and 1950's due to the development of field theory. Field theory was developed by Kurt Lewin, who was influenced by Gestalt Psychology, and developed the theory that $B = f(P,E)$. Lewis' equation means that "behavior (B) is a product of the person (P) in their environment (E)" (Pelletier 2015). Gestalt psychology also died off due to the emergence of cognitive science and neuroscience in the 1970s. In 1965, Köhler had been working on an electric field theory seperate of Lewin's, and it had been heavily criticized by his peers, who rejected it of any significance, thus rendering Köhler's ideas as dead. Köhler and Gestalt psychology were heavily criticized on their methodology towards their experiments. According to the critics, their methodology consisted of demonstrations with too simple stimuli, creating laws without careful consideration and precision, and finally for having no causal explanation to these phenomena (Wagemans et al. 2012). However, Gestalt psychology still remained prominent in experimentation by later psychologists, mostly regarding research into visual perception and information processing. Recent research has addressed the methodological problems that Gestalt psychology was criticized of, and has made an attempt to solve them. For further information on the criticism of Gestalt Psychology, click here.

Maurice Merleau-Ponty

Köhler and gestalt psychology's influence has reached past the domain of psychology and into other fields, such as the philosophy of French phenomenologist Maurice Merlau-Ponty. Merlau-Ponty was interested in perception, and was attempting to redefine the way humans perceive in a way separate from Kantian beliefs and influences. In doing so, he used the research and psychological findings of Gestalt psychology to shape his phenomenology of perception. In particular, Merlau-Ponty referred to the "nervous system as a field of forces", which was inspired by Köhler's field theory (Toadvine 2018). Furthermore, Merlau-Ponty used Köhler's experiments on chimpanzees to claim that a humans orientation towards objectivity is on a level of symbolic behavior, exclusive to humans. While other animals orient themselves towards things in a functional behavior, a humans symbolic behavior allows them to "orient themselves towards objectivity, truth, creativity, and freedom from biological determined norms"(Toadvine 2018).

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13.8 1 Some other key figures in the history of Gestalt Psychology (stubs):

13.8.1 1.1 Max Wertheimer

13.8.2 1.2 Kurt Koffka

CHAPTER 14

History of Intelligence Testing

Author Britt Anderson

Contents:

14.1 Lewis Terman

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14.1.1 Authors:

Larissa Ward, Farzan Dubash, Alex Blackburn, Bhumika Bhandari, and Karlyssa Fluttert

14.1.2 Purpose:

The purpose for this paper is that it is written for Arts 140 class assignment. It will let students learn more about a specific psychologist. In the process of doing this assignment, students will further develop their research, communication and presentation skills.

14.1.3 Date:

Dec 14, 2018

14.1.4 Summary:

Lewis Terman is widely regarded as the father of modern IQ testing. His Stanford-Binet scale helped to revolutionize the testing of children in order to uncover "giftedness" (Wertheimer & Kimble, 2013). His study of gifted children, known as "Terman's Termites," tracked children he identified as gifted throughout their lives, with many ending up in successful positions (Leslie, 2000). Although Terman's studies were revolutionary and are still used today, his intentions were not always the best with his studies. Early on, he was an advocate for eugenics, claiming that his studies showed that lower intelligence was a hereditary trait in certain minorities (Martschenko, 2017). Despite this, his research was extremely useful in the field of intelligence and it has helped psychologists better pinpoint giftedness in children.

14.1.5 An Overview of Lewis Terman:

14.1.6 Personal Life:

(Mainly adapted from Crosby & Hastorf, 2009)

Lewis Terman was born in Johnson County, Indiana in 1877. Terman was the 12th of 14 children born to a farming family. Most of the children that Terman went to school with would not study past 8th grade because most of them would drop out of school to help on the family farm. Terman was born in an area where a majority of people had a career in farming or teaching, so there was little to his future that would suggest that Terman would have a career in anything other than farming or teaching. Terman was always described to be bookish and ambiguous. Terman was

also said to have an interest in children of unusual abilities or disabilities from a young age which contributed to his later studies in intelligence and giftedness (Leslie, 2000).

Beginning in 1892, Terman attended Central Normal College (CNC) in Danville Indiana for 5 years, where he received a BS, Bpd (Bachelor of Pedagogy), and an AB. Terman spoke very fondly about his time and the enjoyment he had while attending CNC. In 1901, Terman then attended Indiana University. While attending Indiana University, Terman developed the ambition to become a professor of psychology and contribute to the discovery of science. In 1903, Terman began graduate work at the Clark University. Clark University's requirements encouraged students to follow their own interests rather than to follow a presubscribed course of study. Terman found the environment suited his needs well because he said he never worked well under the restraints of rules and regulations. While at Clark University, Terman attended G. Stanley's Hall's seminars on children psychology every Monday night. These seminars were deemed to have a great influence on his development of intellectual intelligence later in life. While at Clark, Terman's interest of gifted and defective children began to expand, leading him into an interest of mental testing. Terman first introduced his idea to pursue the field of mental testing to G. Stanley Hall, but Hall empathetically expressed his disapproval for mental testing to Terman. Given that Terman's mind was made up and he was determined, Hall eventually granted his blessing to Terman and gave him some advice about advancing into a new field of study. Terman created his thesis on bright and dull children and focused on the different tests that could help to differentiate the children.

Terman was later troubled by "mildly active tuberculosis" causing him to choose a position in California in the interest of his health with his wife and two kids (Leslie, 2000). He began his career in California as a school principal in San Bernardino for a year. After that, he spent four years as a professor of child study and pedagogy at Los Angeles State Normal School (Leslie, 2000). In 1910, Terman accepted a position in the school of Education at Stanford University. Terman later said that his acceptance of the job had led to an ideal time in his life and career. Later Terman was granted as chair of the psychology department at Stanford for two decades. Terman remained at Stanford University until his death in 1956 (Leslie, 2000).

14.1.7 Major Research and Theories:

14.1.8 Stanford-Binet Intelligence Scales:

Summary:

Lewis Terman made revisions to the Alfred Binet Intelligence Scale which made the previously developed scale more adaptable to adults. Prior to his revisions, the scale only went up to age 15 (Lewis M. Terman, 1916). Terman used the intelligence quotient to categorized people's intelligence. Terman viewed people as having IQ as "fairly constant with changing age" (Boring, 1956). This led to the conclusion of testing children to find ones that had high IQ, who were going to be high in society (Minton, n.d.). Thus, this lead Terman's purpose of his tests to coincide with the eugenics movement and lead to his further research of gifted children.

One of Lewis Terman's most significant contributions to psychology was his revisions to the Binet-Simon Intelligence Scales, now called the Stanford Binet Scale, or Intelligence Quotient scale. The intelligence scale was first developed by Alfred Binet and Theodore Simon in 1905 called the Binet-Simon Scale (Wertheimer & Kimble, 2013). The original purpose of the study was to be able to identify and accurately diagnose sub-normality children; children with learning disabilities in order to help them.

Fig. 1: Binet Measuring and Testing Children

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Binet thought that there were 2 things that could lead someone to have a deficiency in school performance. First, he said that a child may lack in school performance because they initially are not intelligent, lacking the right genes. Second, he said that a child might not perform in school as well because of life circumstances that have hindered

their ability to have similar intelligence to others of the same age. He also believed that "intelligence was a capacity that grows with children's ages but at varying individual rates" (Wertheimer & Kimble, 2013). Thus, Alfred and Simon came up with 30 tasks for kids ages 3-15 to determine intelligence scales dependent on the child's age. The tasks consisted of "identifying the differences in memory, ability to reason, ability to compare, comprehension, time orientation, number concepts, power to combine ideas into meaningful wholes, and the maturity of apperception" (Lewis M. Terman, 1916) [To read more about Binet-Simon Method see "The Measurement of Intelligence" by Lewis Terman – Chapter III or see the book) *The Development of Intelligence in Children (The Binet-Simon Scale)* by Binet and Simon] Meaning, the ability to use logic and reasoning in order to solve problems. This laid the groundwork for Lewis Terman's revisions.

Lewis Terman took the Binet-Simon Scale and found that it had flaws because it didn't address "higher mental level" (Lewis M. Terman, 1916). Terman wanted to improve the scale and to do so, Terman took years studying and testing varying levels of people's intelligence including children in schools, business men, unemployed men, and high school students [To read more about the tests conducted by Terman see "The Measurement of Intelligence" by Lewis Terman – Chapter IV]

With the extensive testing, Terman used the term Intelligence Quotient, IQ to determine a scale of intelligence. The Intelligence Quotient was originally developed by William Stern however, due to Terman's success with the extensive testing which improved the tests for mental age, he showed that "IQ is indeed fairly constant with changing age, at least when cultural influences are also constant" (Boring, 1956). The Intelligence Quotient was a scale that gave people's intelligence based on their mental age, divided (hence intelligence "quotient") by their chronological age multiplied by 100.

Fig. 2: Intelligence Quotient

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Mental age referred to an individual's ability to use logic and problem solving. This was then measured against, the data found through testing many people to find, the traditional/normal range of that person's mental age for the chronological age they were. A person who was "normal" for their age would have an IQ of 100 and was called to have a "general intelligence" (Leslie, 2000), anyone below was considered to have a problem and was called "feeble-minded" (Boring, 1956) and anyone who was significantly higher was considered gifted. This allowed for a standard scoring scale which was used in schools to assess students' abilities. It was also used in World War 1 by Terman making specific tests to screen army recruits (Leslie, 2000). Being that this new way of testing was so applicable to a wide variety of people, it started to be more known by the general public and gained public acceptance.

I Q	*Classification*
Above 140	"Near" genius or genius.
120–140	Very superior intelligence.
110–120	Superior intelligence.
90–110	Normal, or average, intelligence.
80– 90	Dullness, rarely classifiable as feeble-mindedness.
70– 80	Border-line deficiency, sometimes classifiable as dullness, often as feeble-mindedness.
Below 70	Definite feeble-mindedness.

Fig. 3: IQ Scale

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However, Terman viewed people to be born with a pre-set of intelligence, meaning intelligence was based on genetics; not based on home environment or education this was called "original endowment" (Leslie, 2000). This thought that intelligence was hereditary, contributed to Terman's belief in eugenics. According to Webster's Dictionary, "eugenics

is when one wants to improve the human race by selecting certain humans to breed in a certain populations (and sterilizing the ones that do not fit in this category) in order to improve the population's genetic composition." With this thought of eugenics, Terman's purpose for the IQ testing was to find the children who naturally had high IQ and prepare them for higher paying jobs and to be leaders within society (Minton, n.d.) and the ones who had lower IQ scores would be institutionalized and discouraged or prevented from having children (Leslie, 2000). With the increased acceptance/awareness of IQ testing and Terman's purpose for IQ testing it led to the furtherment of the eugenics movement and eventually it led him the study of the identification of gifted children.

14.1.9 Genetic Studies Of Genius:

Summary:

In 1921 Lewis Terman conducted a study called The Genetic studies of Genius. He followed the lives of children who had a high degree of IQ (130 or above). This study is the oldest and the longest running longitudinal study in the discipline of Psychology. Terman called these students Termites. These children tended to be healthier, taller, high on self-confidence and more socially adapted than other children. They were assumed to be successful in life as they grew up. This study was criticized for taking samples from higher socioeconomic strata and less representation of minorities. (Genetic Studies of Geniuses ~ Lewis Terman)

The Genetic Studies of Genius, by Lewis Terman is the oldest and longest-running longitudinal study in the field of psychology. It began in 1921 at Stanford University to scrutinize the characteristics of gifted children (Leslie, 2000). A gifted child is one who naturally has a high degree of general mental ability or extraordinary ability in a specific activity. Giftedness in many countries is identified or defined by person with IQ equivalent to 130-140. However, educational institutions used a wide array of measures to define giftedness, it includes aptitude in musical, verbal-mathematical, spatial-visual and interpersonal abilities (Gifted child psychology, Encyclopedia Britannica).

Terman followed the lifestyle of 1500 highly intellectual students (3-19 years old). These children were overwhelmingly white and from middle /upper-class urban areas. Terman referred to these gifted children as Termites. Many people assumed that gifted children would grow up to be awkward and shy adults who would not be able to succeed as it was said, "early to ripe, early to rot." However it was found that these children were successful in life, they tended to be healthier, taller and more socially adapted than other kids. Terman assumed that the children with high IQ would grow up into an elite group. These children also had better health as they aged and were more successful as a group. They completed higher education at a much higher rate compared to the average. Women had fewer children and had them later in life as they chased higher degrees. The gifted group was financially better than any comparison group. As Terman followed this group for 35 years, they showed an impressive array of accomplishments: Of just the gifted males; 70 were listed in American Men of Science, three were elected to National Academy of Sciences, 10 entered in the *Directory of American Scholars* and 31 appeared in Who's Who in America (Terman, L, 1959).

In the later part of the Genetic study of Genius, aided by his assistants, Terman conducted interviews with the parents of gifted children and he also interviewed the gifted children. In these interviews there was a wide variety of tests and inventories tested. Data was collected in 1922 and 1928 which had family life and school experience as the focal point; it involved interviews and questionnaires involving mothers of gifted children. The follow-ups in 1936 and 1940 occurred at the time of educational achievement and commencement of adult careers for many of the participants. The postwar years through the 1960s was the period of marriage and family development, career beginnings, and accomplishments. The data collected in the postwar years relied mainly on survey forms mailed to the study members. The files of the collected data from the study members included a rich selection of other data: news clippings, interviewing the parent, questionnaires from spouses, and letters.

It was estimated that Termites did not come close in calibre to the true scientific elite of the same nation and era. In the book, *Greatness: Who Makes History and Why*, Dean Simonton said,

Let us give Terman the benefit of the doubt and post that all 2,000 scientific and technical publications were produced by the 70 who made it into American Men of Science. That implies that, on average, Terman's notable scientists produced about 29 publications by the time they had reached their mid-40s. In contrast American Nobel laureates in the sciences averaged about 38 publications by the time they were 39 years old, and claimed about 59 publications

by their mid-40s. That amounts to a twofold disparity in the output. Hence, Terman's intellectual elite was not of the same calibre as the true scientific elite of the same nation and era (Simonton, D, 1944).

It was also believed that accomplishments of the study of Termites could have been predicted on their socioeconomic strata alone. This was thought because there were mostly white, middle to upper middle-class men which would already have more opportunities and resources. Also, Terman included very few minorities in his sample to be specific, only 4 Japanese students, 1 black child, 1 Indian child and 1 Mexican child in a total of 168,000. Teachers at that time were biased towards identifying white students with talent because many other talented students weren't given the chance to take his test. It was noted by Terman that minority groups like; Italian, Portuguese and Mexican in California had low IQ at that time (Lewis M. Terman, 1926). The follow – up data from The Genetic study of Genius included 1,023 participants, according to which early reading was linked with academic success, it was less associated with lifelong educational attainment and was hardly related to midlife adjustment. Early school entry was associated with less educational attainment, worse midlife adjustment and even increased mortality risk (Kern & Friedman, 2008).

14.1.10 Other Research and Theories:

14.1.11 Sex And Personality:

Summary:

Lewis Terman attempted to measure the variability of masculinity-femininity in personality with the help of the Masculinity-Femininity test. Women and men are always considered to be different. This study proposes that women experience greater degree of emotions. The test is a pencil and paper test, with no specific time limit. People who deviate from the score range tend to have a romantic relationship with same sex person (Terman & Miles, 1936).

This intensive study by Lewis Terman tends to use an experiential scale to assess the variable of masculinity-femininity. It was conjectured that men and women, as distinct groups, display differences in their sex and characteristics in their behavior which have a great impact on their personality. Many social trends have attempted to reduce these deeply embedded differences in society and in the minds of the mankind (Terman & Miles, 1936). The enfranchisement of women and the rapid expansion of their role in political (in 20th century), commercial and other fields proved that these differences are less in magnitude than they thought to be. In modern Western cultures, women are assumed to experience tender emotions like pity, sympathy and parental love. As compared to males, females are more timid, religious, prone to jealousy and suspicious. The sexual feelings of women are less meticulously localized in their body (Terman & Miles, 1936).

The purpose of the test was concealed by the title "Attitude and Interest Test" in order to prevent the participants to have any bias response; it allowed the results to not be manipulated by the subjects. The Masculinity–femininity test had two identical parts A and B which in total consists of 910 items. The test was a pencil-paper test with no specified time limit. Each response bears a weight of one point and can be '+'or '-'. Scoring of the test was done by a stencil thus it was completely objective. People who deviate from the test range scores are assumed to be indulged in a romantic attachment with people of same sex (Terman & Miles, 1936).

14.1.12 Psychological Factors In Marital Happiness:

Summary:

Another study Lewis Terman was to test if one could predict marital happiness. *The tests got the scores of happiness and related them statistically to various supposed contributors to marital happiness (Daniel, 1940). It was found that the thought contributors to marital happiness, did not have as much correlation. However, it was found that childhood happiness and if the spouse was generally a happy person contributed somewhat to marital happiness. There was no one factor that determines the prediction of marital happiness.*

In this study by Lewis Terman tested 792 couples who were married and 109 couples who were divorced. The goal was to find out if there was a way to predict marital happiness. Lewis Terman used personality tests and responses to

questions to measure happiness. The criteria for happiness was based on the tests conducted which became the scale of happiness. This scale however was disproportional because the answers all tended toward the extreme happiness. Terman compared his results of a person's happiness compared to 4 factors that might affect a marriage. The factors were, "degree of marital happiness, personality characteristics, background factors, and sexual attitudes and adjustments" (Daniel, 1940). Terman wanted to see the correlation between how happy an individual person felt compared to factors of marital happiness (L. M. Terman, Buttenwieser, Ferguson, Johnson, & Wilson, 1938). Through the tests they got the scores of happiness and related them statistically to various supposed contributors to marital happiness (Daniel, 1940). The conclusions they made from their findings was that the causes or factors that were thought to have an impact on marital happiness didn't have as much impact as they thought. For example, the value of differences in ages, or in education between spouses, or sexual relations has much less of an impact than anticipated (Daniel, 1940). It was found that if the individuals, husband or wife, were happy, together as a couple, they would have a happier relationship. The study also found that factors of childhood happiness, attachment/relationship to mothers and fathers, and childhood punishment had a role on happy marriages (Daniel, 1940). However, these relationships gave correlational factors to marital happiness there was no one single causal factor found to marital happiness. This is because marital happiness is much more complex than correlating tests.

14.1.13 Criticism:

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Throughout his academic career, Lewis Terman did a lot of work to further studies of intelligence, completely changing how we view "gifted" individuals. However, some of his ideas were also extremely problematic. In his earlier academic years, Terman supported eugenics, advocating the sterilization of those that he referred to as "feeble minded" in order to produce a more intelligent society. When he improved the Stanford-Binet scale, he claimed that one of the primary uses was "curtailing the reproduction of feeble-mindedness and in the elimination of an enormous amount of crime, pauperism, and industrial inefficiency" (White, 2000). He was also a member of the Human Betterment Foundation, an American eugenics organization that advocated for forced sterilization and created publicity towards research into sterilizations carried out in California. In 1928, he stated that "It is more important, for man to acquire control over his biological evolution than to capture the energy of the atom" (Wang, 2016). Although Terman backed away from these concepts later on in life, he never publicly recanted these beliefs and statements (Cherry, 2018).

In addition to these arguments supporting eugenics, Terman also believed that intelligence varied by race and advocated for segregation. In his book published in 1916, he wrote that:

High-grade or borderline deficiency ... is very, very common among Spanish-Indian and Mexican families of the Southwest and also among Negroes. Their dullness seems to be racial, or at least inherent in the family stocks from which they come ... Children of this group should be segregated into separate classes ... They cannot master abstractions but they can often be made into efficient workers ... from a eugenic point of view they constitute a grave problem because of their unusually prolific breeding (Martschenko, 2017).

He also chose to emphasize the need to stick to established gender norms, through a questionnaire that determined gender based on motivational and emotional traits that were thought to differentiate the sexes.

In his genetics study of genius, Terman's approach was extremely flawed, given the fact that those he studied were primarily white, urban and from middle class families. It lacked balance, featuring only two African-Americans, six Japanese Americans and one Indian-American (Leslie, 2000). This lack of diversity meant that the studied was not as comprehensive as it should have been to capture the true information around gifted children. At the time, teachers, like most of the world, were likely more biased towards these white, middle class students, already giving them a learning advantage.

Terman also had a feud with a journalist named Walter Lippmann, who argued that it was impossible to classify human beings using a single test. Lippmann referred to Terman and other intelligence-testers as "the psychological battalion of death", due to the fact that these tests were used to shape and decide the future of a child. Lippmann wrote that he hated the "sense of superiority that it creates, the sense of inferiority it imposes" (Leslie, 2000), referring to the

culture created by classifying people by intelligence. Terman would eventually prevail in this feud, in the sense that the popularity and use of intelligence testing continued to increase over time.

14.1.14 Current Research on Theories:

This component of the biography focuses on other/ current research on intelligence that is in some way different from Terman's research. It will largely be a summary of Robert J. Sternberg's summary of intelligence research titled "Theories of Intelligence" (2018). This is done due to the abundance of information in the summary presented by Sternberg and a lack of information on relevant other/ current theories and research on intelligence elsewhere. Although this component largely reflects Sternberg's summary, it was intended to be presented in a more concise manner, highlighting the important research. Also, connections are made between the different research on intelligence that Sternberg includes in his summary, as well as connections between the research on intelligence and Terman's research and ideas.

In 1986, when 24 cognitive psychologists were asked what intelligence is, they emphasized four concepts (Sternberg, 2018). The first was the ability to learn from experience, the second the ability to adapt to the environment, the third was metacognitive properties-the ability to understand and control one's own thinking process, and the fourth was the role of culture-that what is considered intelligent in one culture may differ from what is considered intelligent in another culture (as cited in Sternberg, 2018). The opinions of lay people may also be relevant to the study of intelligence, such as societies folk conceptions and implicit theories on intelligence (Sternberg, 2018). For example, a smart salesperson and a smart neurosurgeon may be perceived as having different qualities (Sternberg, 2018).

The first intelligence researcher that will be discussed is Francis Galton. Galton believed that intelligence is a function of psychophysical abilities (Sternberg, 2018). Like Terman, Galton believed in using standardized tests to measure abilities. Galton measured a broad range of psychophysical skills, such as the ability to notice small differences in the weights of objects, the ability to notice small changes in pitch or tone, and physical strength (as cited in Sternberg, 2018). Galton was also like Terman in his support of the eugenics movement. Galton was a cousin of Charles Darwin, the famous founder of evolutionary biology, which inspired Galton into investigations of human heredity (Gillham, 2002). Galton ended up inventing pedigree analysis, which sought to measure the heritability of human talent and character (Gillham, 2002).

The next researcher who did important work in intelligence was Alfred Binet. Binet was tasked with developing a test to distinguish typically developing children from intellectually disabled children (as cited in Sternberg, 2018). He and his research assistant Theodore Simon developed the Binet-Simon Scale to address the cognitive ability of children by assigning them a mental age, which was the average performance of children of that age (Sternberg, 2018). The Binet-Simon scale was later updated by Terman and labelled the Stanford-Binet Intelligence Scale, whose main purpose was to be a general intelligence test ("Alfred Binet", 2015). The Stanford-Binet Intelligence Scale became an important part of the eugenics movement ("Alfred Binet", 2015), which Terman supported. Theoretically, Binet thought that judgement was the key component of intelligence. Binet asserted that intelligence composed three distinct categories (as cited in Sternberg, 2018). The first is direction, which involves knowing what must be done and how to do it, the second is adaptation, which involves forming a strategy for completing a task and then monitoring that strategy while implementing it, and the third is criticism, which is the ability to critique your own thoughts (Sternberg, 2018). All three of these categories fit with contemporary views of intelligence (Sternberg, 2018). Current research that correlates with Binet's categories is research on global and local planning. Global planning involves encoding the problem and formulating a general strategy to attack the problem (Sternberg, 2018), which correlates with Binet's concept of direction. Local planning involves forming and implementing strategies for the details of the task (Sternberg, 2018), which correlates with Binet's concept of adaptation. Research has found that those who score higher on intelligence tests take more time for global planning during task completion but take less time for local planning (as cited in Sternberg, 2018). Sternberg concludes that: "The advantage for spending more time on global planning is the increased likelihood that the overall strategy will be correct" (Sternberg, 2018). Also, Binet's concept of criticism correlates with modern conceptions that metacognition is important in understanding intelligence (Sternberg, 2018). Unlike Terman, Binet noted that intelligence encompasses more than what IQ tests can measure. Binet's early work was not without controversy though. He started his career studying hysterical patients, and asserted

that "I believe it satisfactorily established, in a general way, that two states of consciousness, not known to each other, can co-exist in the mind of a hysterical patient" (Van der Hart & Dorahy, 2010).

Another model of intelligence is the hierarchical, or ranked model. The hierarchical model suggests that there are two forms of intelligence, fluid ability and crystalized ability. Fluid ability is the speed and accuracy of abstract reasoning, and crystalized ability is the accumulation of knowledge and vocabulary (as cited in Sternberg, 2018). In addition to fluid and crystalized ability, recent hierarchical models propose that learning and memory processes, visual perception, auditory perception, and effortless production of ideas are also relevant to the study of intelligence (Sternberg, 2018).

The biological view of intelligence looks to the brain as the basis for human intelligence (as cited in Sternberg, 2018). There has been found to be a modest but statistically significant association between brain size and intelligence (as cited in Sternberg, 2018) but is not clear whether larger brain size causes intelligence or intelligence causes larger brain size, or whether the relationship is contingent on an unknown third factor (Sternberg, 2018). The way the brain metabolizes glucose may also be relevant for understanding the biological basis of intelligence. Higher intelligence correlates with lower levels of glucose metabolism during problem solving tasks (as cited in Sternberg, 2018). Interestingly, as a result of practice, participants with higher intelligence doing a problem-solving task show less glucose metabolism in most brain areas but increased glucose metabolism in areas of the brain that are thought to be important to the task (Sternberg, 2018). Therefore, "more intelligent participants have learned how to use their brains more efficiently" (Sternberg, 2018). Brain regions that have been correlated with intelligence are the posterior regions, which have been implicated in crystalized intelligence. Damage to these regions results in poor performance on IQ tests (as cited in Sternberg, 2018), which generally measure crystalized intelligence (Sternberg, 2018). Participants with frontal lobe damage perform well on these tests, but have impairments in fluid intelligence (as cited in Sternberg, 2018). These biological studies are largely correlational; they show associations between biological measures and measures of intelligence, but they do not establish causation (Sternberg, 2018). Terman would probably support the biological view because he believed that intelligence was mostly inherited genetically.

Contextualism states that culture is relevant to intelligence, asserting that intelligence must be understood in a real-world and cultural context (Sternberg, 2018). For example, differences in intelligence have been observed in rural versus urban communities, low versus high proportions of teenagers to adults in communities, and communities of different socioeconomic statuses (as cited in Sternberg, 2018). Contextualism accounts for why some people perform better than others on tasks that a culture values (as cited in Sternberg, 2018). It seems to take into account that our social goals determine what our mental capabilities will be. Therefore, the demands on cognition to reach an individual's goals may differ from culture to culture. For example, "people from European and North American cultures tend to process objects independently of the context, whereas people from many Asian cultures process objects in conjunction with the surrounding context" (as cited in Sternberg, 2018). Also, people from collectivist cultures are less likely to commit the fundamental attribution error (Myers, Spencer, and Jordan, 2015), signalling that they interpret events differently than those in individualist cultures. Developing culturally relevant tests aims to combat the assumption that intelligence is the same in all cultures. For example, 14-year-old boys performed poorly on a task when it was framed as a cupcake-baking task but performed well when it was framed as a battery charging task (as cited in Sternberg, 2018). Also, Brazilian maids had no difficulty with proportional reasoning when hypothetically purchasing food, but great difficulty with the same task when it was purchasing medicinal herbs (as cited in Sternberg, 2018). These studies show that the context of which a task is presented greatly affects performance on that task (Sternberg, 2018). Contextualism seems to counter Terman's beliefs. Terman believed in eugenics, and that intelligence was mostly inherited genetically, while contextualism tries to account for the intelligence of different cultures on culturally relevant tasks.

The last theory of relevance to other/ current theories of intelligence is Sternberg's triarchic theory of successful intelligence. Sternberg notes that "According to this theory, intelligence comprises three aspects: dealing with the relation of intelligence (a) to the internal world of the person, (b) to experience, and (c) to the external world." (Sternberg, 2018). The "internal world" part of the theory emphasizes information processing and separates information processing into three distinct components. The first is metacognitive abilities, the second is lower-level processes used to carry out the task, and the third is knowledge acquisition, or the learning of how to do a problem in the first place (Sternberg, 2018). The "experience" part of the theory states that we all have varying familiarity with different tasks and that the more familiar a task is the more automatic it's completion becomes (Sternberg, 2018). Sternberg asserts that familiar tasks and novel tasks make different demands on intelligence (Sternberg, 2018). The "external world" part of the theory states that intelligence serves three functions in the real-world: To allow the individual to adapt to existing

environments, shape existing environments to create new environments, and to select new environments (Sternberg, 2018). To test the usefulness of the triarchic theory, Sternberg and colleagues performed a study that matched students abilities (either high in analytical, creative, or practical ability) with instructional designs geared to teach the student in their preferred ability. They found that students high in one ability who were matched with instructional design that taught to that ability outperformed students who were mismatched (Sternberg, 2018). For example, "A high-analytical student placed in an instructional condition that emphasized analytical thinking outperformed a high-analytical student placed in an instructional condition that emphasized practical thinking." (Sternberg, 2018).

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William Stern

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The definition of “early to ripe, early to rot”

American Men of Science

National Academy of Science

Marital Happiness

Human Betterment Foundation

The Measurement of Intelligence:(Written by Lewis Terman in 1916)

Walter Lippmann Bio

Metacognitive

Francis Galton

Pedigree Analysis

Hysterical Patients:

A video with further information about Lewis Terman

An article “75 Years Later, Study Still Tracking Geniuses”

14.2 1 Some other key figures in the history of measuring intelligence (stubs):

14.2.1 1.1 Galton

14.2.2 1.2 Spearman

14.2.3 1.3 Cattell

14.2.4 1.4 Yerkes and Woodworth

14.2.5 1.5 Binet

14.2.6 1.6 Goddard

CHAPTER 15

Early Applied Psychology

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15.1 1 Stub

15.1.1 1.1 Phrenology - An early clinical psychology?

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1.2.1 Witmer

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CHAPTER 16

Women in Psychology's Early Years

Author Britt Anderson

16.1 M. F. Washburn

Authors: Diya Dadlani, Marina D'Amore, Alexandra Ghirca, Stefan Mutlak, Josh Rosen, Nancy Tran. Purpose: For ARTS 140 Section 8 as an assignment. Due Date: Dec. 14th, 2018

Fig. 1: Margaret Floy Washburn, image taken from Wikimedia

16.1.1 Abstract

Born in 1871, Margaret Floy Washburn was a leading female psychologist in the 20th century. She was the first female psychologist to receive a PhD in Psychology from Cornell University, later becoming the second woman president of the American Psychological Association in 1922. While she is known for translating the work of Wilhelm Wundt (Ethical Systems) into English, she has done intense study and work into animal psychology, going on to publish the book The Animal Mind, in which established an important role in psychology as it established the field of animal psychology as a field of study. Across her career, she focused on the study of comparative psychology, consciousness, animal cognition and motor skills.

16.2 Biography

16.2.1 Early Life:

Margaret Floy Washburn was born on July 25th, 1871 in New York City, growing up in Harlem as the only child to Francis, a priest, and Elizabeth Floy. Though her family background consisted of mostly Dutch and English, all her family had come to America by the year 1720. She is noted to spend the majority of her time reading, even long before her schooling began at age seven, preparing her well for her education and led to her quick advancement through school.

At age eleven, she began public school and at age fifteen she graduated from high school. In 1886, the same year she graduated, she began studying at Vassar College in Poughkeepsie, New York as a preparatory student and soon after her undergraduate years, came to find herself with a strong interest in philosophy through poetry and later finding herself later developing this interest into an interest in the field of psychology.

Further Reading

16.2.2 Education:

Margaret's education really began at home, where she learned to read at an early age [6]. It was not until she was 7 years old that she entered the private school system, where she excelled [6]. After about a year and a half, Margaret's father enrolled her in a school which was structured as a public school, where she spent most of her time writing stories [6]. Margaret's time in public school proved to be a short one, as she entered highschool at the age of 12. In 1886, only three years later, 15 year old Washburn graduated and moved on from high school [1]. Later that year she was enrolled in Vassar College [1], Poughkeepsie. Although her studies were intensely focused on the sciences, she continued to indulge her love of literature during her spare time.

It was during her first year of study at Vassar that she developed an interest in Psychology and Philosophy, and by her senior year they were cemented as her main areas of study. In 1891, Margaret graduated from Vassar College at age 20 and went to study under the teachings of James Mckeen Cattell at Columbia at their psychological laboratory. Unfortunately, Columbia was not the most receptive College when it came to female students, and so she was only allowed to audit classes there [1]. Cattell treated her as he would any of his male students and later became her mentor.

Eventually, Cattell suggested that Margaret leave Columbia to pursue further studies elsewhere. Taking his advice, Margaret enrolled at Cornell University, which had granted her a scholarship [6], to study at the Sage School of Philosophy. Here, she became Edward Titchener's first graduate student, and would later report that at first "he did not quite know what to do with" her [1]. But it all worked out, as in 1894 Washburn became the first woman to be granted a PhD in Psychology and her doctorate dissertation was later published by Wilhelm Wundt [3].

16.3 Significant Research Contributions

16.3.1 Professional Activities:

Margaret Floy Washburn had quite a few professional activities, not limited to participation in various academic societies, field-related organizations, and academic associations [5]. Upon obtaining her Philosophy and Psychology Ph.D. from the University of Cornell in 1984 [1], she relocated for the next 6 years to Wells College, where she was crowned the Chair of Psychology, Philosophy, Logic and Ethics [5]. In 1985, Wundt honorably approved Washburn's meticulously lab-researched dissertation, on how distances and directions on skin are visually understood, with its focus on the influence the role of vision has on these variables [5]. In 1902, Washburn became the head-psychology assistant professor at the University of Cincinnati, and akin in 1903 at her 'alma mater', Vassar College, settling here until her death [5].

She was an extremely thorough but crystal-clear professor of animal and social psychology, a University of Cornell warden and a scientist, who left her mark on her students and close psychologists and faculty [5]. While practicing at Vassar College, Washburn implemented what we now know as Co-Op with her upper-year students, giving them the reward of having their solutions integrated with her work, in the school's 'Laboratory Section' of the American Journal of Psychology, thus allowing the students to leave their significant imprint on the scientific community [5]. Some of her lab. topics analyzed include: 'Memory of Hand and Diverse Spatial Locomotion' [10], '3D Apprehension by the Eye', 'Experimental Esthetics' and 'Issues in Animal Psychology; Relating the Entire Human to the Notion of Possible Animal Consciousness' [5].

M. F. Washburn had worked more than 25 years in developing some of her smaller laboratory experiments, for example, the 'Memory of Hand and Diverse Spacial Locomotion' as referenced by York University's Christopher D. Green (2000, April) in Classics in the History of Psychology [10]. In this experiment, Washburn discovered that part of our primal front cortex, the left side of the primary cortex which controls the right side of the body,[9] the part of the brain that deals with spatial movement, can better recall movements of the left hand, rather than those of the right hand. This is highly likely due to more automatization, or subconscious level movement of the left hand in the brain [9]. Washburn found out that it was puzzling how one can feel or decipher muscle movement in the skin of the hand, when the direction of the movement cannot be figured out [10].

In 1908, Washburn published her first book 'Animal Mind' which encompassed both the idea of animal consciousness and animal behavior and was frequently edited, to include new points of view and ideas, such as the popular 1912 concept of 'behaviorism' [5]. Washburn was President of the American Psychological Association (and of its New York location), and Vice-President and Chairman of Psychology at the American Association for the Advancement of Science [5]. Twice, during the late 1910's and late 1930's, Washburn was on the Division of Anthropology and Psychology of the National Research Council, even as Chairman [5].

She was a 30-year working member of the National Academy of Sciences, un-discriminatory in her research collaborations [5]. A valuable contribution, Washburn installed the National Research Council's 'Psychological Abstracts' journal and edited the American Journal of Psychology for a cumulative period of 36 years [5]. In 1927, she received a commemorative Vol. of the journal [5]. Her most developed, thorough theory is the 'Motor Theory of Ideas and Perceptions' [5]. A more detailed account of her professional activities can be found at Nasonline.org [5], short for National Academy of Sciences, under biographical memoirs, under the .pdf journal name of 'National Academy of Sciences of the United States of America Biographical Memoirs, Volume XXV Twelfth Memoir: Biographical Memoir of Margaret Floy Washburn 1871-1939' by Robert S. Woodworth, presented to the Academy at the Autumn Meeting, 1948.

16.3.2 Key Accomplishments:

For a woman of science in the 1900s, Margaret Washburn contributed a lot to the field of psychology. She wrote many publications including The Animal Mind. She was the first female to receive a PhD. The fact that she became a respected psychologist in a field dominated by men is an accomplishment in and of itself.

While being a professor with a PhD is always a great accomplishment, Washburn became one during times where women were discouraged from such occupations. For most of her career she taught at Vassar College [1]. Not only did she become one, she was also very respected amongst her students. Something that made her such a good professor during her time at Vassar College, was that she allowed her students to take part in her research. Like a co-op program, she would choose major students to help her with an experiment that she was working. She would do some of the heavy lifting, but she gave them the opportunity to take part in the process, namely running the experiments and calculating the results [5]. This experience allowed her students to gain hands-on exposure in the field of psychology. To be a female professor during her time was a great accomplishment, but the fact that she was able to implement new strategies to help her students is another huge accomplishment .

Margaret Washburn's publications helped to change and evolve psychology into what it is today. One of her more well known publications was her book The Animal Mind. The publishing of this book allowed for a new avenue of psychology, animal psychology, to be formed. The book was also very popular, as she wrote three other editions after the original. This book also was different in the fact that Washburn had used the experimental method to help support her research [4]. This was notable since behaviourism was a popular way of thinking amongst psychologists, and Washburn turned away from this way of thinking. In the book she stated that the origin of consciousness in the animal world is unknown. This book allowed psychologists at the time to view topics in a different perspective [5].

Another accomplishment of Margaret Washburn was how she blazed a path for the future for females in the field of psychology and science as a whole. She was the president of the American Psychological Association, marking only the second time a woman had received that honour. As well, she was named, a fellow of the National Academy of Sciences, in which she was also only the second woman at the time to receive that distinction [3].

16.3.3 Discoveries:

She made 4 significant contributions to psychology—the problems of social consciousness, the problems of revived and ideated emotions, the role of movement in the development of mental life, and the field of animal psychology.

Washburn pointed out that social activity precedes social consciousness and that the animal responds to the behavior of other animals rather than to any idea of their mental states. Later, psychologists began to conceive of the social behavior of man as a reaction to the behavior of others. Miss Washburn later falsified this claim.

Her interest was in seeking to learn something about the subjective experience of animals, everything that ranged from their sensations to their ability to form associations. She tried to bridge by imagination the gap between human consciousness and that of animals whose differing anatomical structure would prevent them from having the same sensations as people. The Animal Mind brought forth a flood of experimental evidence for these positions.

She also studied the affective value of articulate sounds. She suggested as a measure of affective sensitiveness (that is, the tendency to be strongly affected both in the direction of pleasantness and in that of unpleasantness) the ratio of the sum of the number of judgments of extreme pleasantness and extreme unpleasantness to the number of judgments of indifference. She tried this method out on 'poets' and 'scientists. The 'poets,' as might be expected, showed higher affective sensitiveness than the 'scientists,'indicating that her technique of measurement might have practical value in investigating an individual's bent. http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/washburn-margaret.pdf

16.3.4 Contemporary Assessments on Their Work:

Washburn's The Animal Mind is one of her most significant works, in which she argued that animals' mental states should be studied alongside their behavior, and outlined these arguments in her book. The Animal Mind established an important role in psychology as it established the field of animal psychology as a field of study. Moreover, later editions of The Animal Mind were the standard textbook of comparative psychology for nearly 25 years.

Her book outlined numerous experiments in animal psychology, including the consciousness and behavior of over 100 different animal species, compared to her contemporaries who primarily focused on rodents. As a result, she strongly influenced comparative psychology from The Animal Mind. She also developed a motor theory of cognition,

suggesting that the body's movements had an influence on thought, of which she wrote about in her second book Movement and Mental Imagery, published in 1916. Psychologist E.G. Boring (1929) recognized Washburn's important role in establishing animal psychology, as The Animal Mind provided a concise collection that marked the growth for this new scientific field of research [4]. Additionally, other contemporaries that researched animal psychology, such as Donald Griffin (1990) and Marian Dawkins (1993), make references and come to similar conclusions made in The Animal Mind. [4]

Further Reading

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CHAPTER 17

1. Early Women Scientific Psychologists

CHAPTER 18

1.2 Berliner

Section Author: Sarah Young

Anna Berliner was born in 1888 and died in 1977. She was the first and only woman to receive a PhD under Wilhelm Wundt. Her main area of focus was in visual perception that extended into advertising and intelligence testing. Unfortunately, like most women she was overlooked in the history of psychology.

Before her work in psychology, she studied medicine in Freiburg and Berlin. While in Berlin she fell in love with psychology after working at the Berlin Psychological Laboratory. In 1910 she married Sigfrid Berliner, a physicist who took a position at the University of Leipzig, where Anna pursued psychology. After working with a different supervisor, someone noted her interest in the field and that she should talk to Wundt. After going and talking to him and he accepted her, saying that he did not see any reason why she shouldn't work for him. She did not study with him for long, but accumulated a lot of knowledge by working with Wundt in experimental psychology, the history of philosophy, and his Volkerpsychologie. In 1914 she completed her doctoral examination and received her PhD under Wundt. After leaving Leipzig, she and her husband moved to Japan and she worked as a consultant at an advertising firm. After World War I broke out, Anna was deported to the U.S., while her husband was believed to be an enemy alien. While in America, she studied at Berkeley and Columbia, publishing research on children's judgments of beauty. By 1932, she and her husband were reunited, and by 1936 she was lecturing on visual psychology in Chicago, and became the chair and only member of the psychology department. Here, she taught on experimental psychology, statistics, perception, clinical psychology, personality, projective testing to name a few. She believed in the importance of the link between psychology and optometry, and applied the principles of visual psychology to various topics with her main focus being that "seeing is influenced by factors beyond the object of vision". In 1963 she was named a Lifetime Fellow of International Council of Psychologists, and received the Apollo Award (from the American Optometric Association) in 1971. In 1977 she was murdered in her home. Her Legacy: She was a teacher, a researchers and an applied psychologist She helped women's rights be becoming the first woman to ever work with Wundt She was a professional, a critical thinker, a self-teacher, and always learning and applying her knowledge Her famous words: "An unused life is an earlier death"

Primary Source: APA Anna Berliner

18.1 2 Other early women psychologists include (stubs):

18.1.1 2.1 Ricord

18.1.2 2.2 Calkins

18.1.3 2.3 Ladd-Franklin

CHAPTER 19

Writing Exercises

Author Britt Anderson

Contents

- *Writing Exercises*
  - *Overview*
  - *Molyneux*

19.1 Overview

There is only so much that one can learn by reading. At some point real mastery requires active learning, and this can be helped by being forced to put your thinking into words. My hope is that these writing exercises will provide readers with a chance to engage with the material in a concrete and educational way.

19.2 Molyneux

1. What was the question that Molyneux asked Locke? Provide a link to the source in *An Essay Concerning Human Understanding*.
2. Why was this question pertinent to Locke's philosophy of mind?
3. What was the answer Locke gave?
4. What has been **history's** answer and how was it determined?

CHAPTER 20

Indices and tables

- genindex
- modindex
- search